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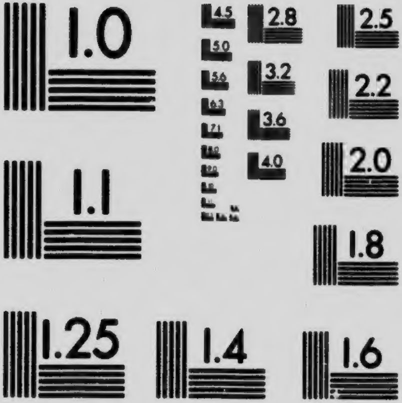

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MORANG'S MODERN TEXT-BOOKS

TARR AND McMURRY GEOGRAPHIES

OUR HOME
AND ITS SURROUNDINGS

A FIRST BOOK OF MODERN GEOGRAPHY

PRICE, 40 CENTS

Authorized by the Minister of Education for use in the
Public Schools of Ontario

Authorized by the Advisory Board for use in the
Public Schools of Manitoba

TORONTO
MORANG EDUCATIONAL COMPANY LIMITED
1907

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PREFACE

This little book is intended to be the child's first step in the study of geography, and as it is a practical innovation, it perhaps needs an explanatory foreword.

Necessity for Home Geography. — The final basis for all study of geography is actual experience. Yet textbooks on this subject rarely treat Home Geography at all, and those that do, devote but few pages to it. The subject should, we think, receive far more careful attention.

Necessity for Other Basal Notions. — Home experience alone, however, cannot afford a complete basis for the later study of geography, because no one locality presents all the features required. From this it happens that the best books have contained some definitions and illustrations, as of mountain, river, valley, harbor, and factory, and have planned to build the later text with the ideas these gave as a foundation. Such conceptions are certainly necessary in the early part of geography; but mere definitions fail to produce vivid, accurate pictures. The average pupil who has pursued geography for a year has little notion of the great importance of soil, of what a mountain or a river really is, of the value of good trade routes, and why a vessel cannot find a harbor wherever it will cast anchor along the coast. Yet such ideas are the proper basis for the study of geography in the higher grades. The fact that they are so often wanting is proof that our geography still lacks foundation.

HOW THESE NEEDS ARE MET. — In this first volume the attempt is made to supply this foundation by treating first such common things as soil, hills, valleys, products, animal life, people, industries, climate, and government, which are part of every child's environment; and secondly, other features, as mountains, rivers, lakes, and the ocean, which, though absent from many localities, are still necessary as a preparation for later study. Definitions. however, are not relied upon for giving the child this extra knowledge, but detailed descriptions and discussions instead. This by no means involves neglect of the child's own environment from the time the unfamiliar matter is introduced, for references to home experiences in this regard are frequently used. We believe that our plan gives a fuller guarantee of fitness for advanced study than has heretofore been furnished.

RELATIONSHIP TO MANKIND. — According to the definition of geography, — which treats of the relation between man and the earth, — a hill or a lake is worthy of mention only because it bears a relation to us, the men upon the earth; considered by itself it is not a part of geography. Therefore, each chapter which takes up one of the above subjects, either closes with the bearing of the given topic upon mankind, or it deals with the human relationship throughout.

REVIEWS AND SUGGESTIONS FOR FURTHER HOME STUDY. — A study of books alone can never furnish an adequate knowledge of geography. Therefore it has been thought expedient to make numerous suggestions upon each section, in order to remind both teacher and pupil of suitable excursions, experiments, etc., to show at the same time the breadth of the subject, and to encourage the habit of investigating the home environments. Review material is always suggested in frequent comparisons and contrasts, and in introducing new topics through others that have already been presented.

Maps. — The succeeding volumes of this series are of the same size as the present one; our reasons for this marked innovation are — that the old form is both unnecessary and unwieldy. The main excuse for the size of the common geography is the supposed need of large maps, a need which should be supplied by atlases and wall maps. This supposed requirement has led to the introduction of so many names, entirely unnecessary to pupils, that the purpose of a school book has generally been sacrificed to that of a cheap atlas. Aside from this, the old form of geography is distinctly objectionable because of its size, which makes it difficult to handle and to carry. When open it occupies nearly the entire surface of the desk; and being so unwieldy, it is the most easily damaged of all the school books in use.

The most pertinent inquiry in regard to the maps of a text-book of geography should refer not to their size, but to their quality; and in respect of excellence we believe that our maps are the best thus far printed in any geography.

Illustrations. — The illustrations have been selected with great care to illustrate specific points; and for the sake of accuracy, photographs have in most cases been employed. They are not inserted merely for the purpose of entertainment, but in every case bear a distinct relationship to the text. They are not intended as mere *pictures*, but as *illustrations;* and being numbered and referred to frequently, they pay for their space by contributing materially to the book's fund of instruction.

This, as well as the other volumes of the series, is based upon and is largely the work of Professor Ralph S. Tarr, B.S., F.G.S.A., Professor of Dynamic Geology and Physical Geography at Cornell University; and Professor Frank M. McMurry, Ph.D., Professor of Theory and Practice of Teaching at Teachers' College, Columbia University.

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PART I

OUR HOME AND ITS SURROUNDINGS

I. THE SOIL

YOU have often played in the dirt. Did you ever stop to think what it is made of? It was not always what it now is. You know that the wood in your desk was not always a part of the desk; it used to be part of a tree, and has a long story to tell about itself before it was brought to your school. So all the dirt or *soil* that you have ever seen has a long story to tell about how it became what it is now. Let us see what that story is.

When mud dries upon your hands and you rub them together, you can notice an unpleasant, gritty feeling. This is caused by the scraping together of hard bits of something in the soil. If you rub some of this dirt against a smooth piece of glass, you can often hear it scratch the glass. This shows that these little bits must be very hard, for if they were not, they could not scratch anything so hard as glass. They must be even harder than a pin, for you cannot scratch glass with a pin.

It will help you to find out what these bits are if you examine some sand. The grains in it are tiny bits of stone, large enough to be clearly seen. When they are rubbed against glass, they scratch it, because they are hard and sharp.

Sand is made of stone that has been broken up into very fine pieces. Soil is also made of stone, but the pieces are finer still. The soil that you have seen, such as that in the school yard, or by the side of the walk, was once stone.

Soil has been made from stone.

Since soil is found almost everywhere, you may wonder how so much stone has been changed to it. The answer is not hard to find. Did you ever pound a bit of brick up until you made it into dust? You can change a stone to dust in the same way. Break one into small bits and see how much it resembles dirt.

Sometimes one sees men drilling holes into stone; the tiny pieces that are broken off collect in and round the hole, and look like a muddy paste. When a grindstone is used to sharpen tools, small pieces of the stone are ground off, and if water is poured upon it, this dust makes the water muddy, just as soil would.

Much rock has been changed to soil by the rubbing of pieces of stone against one another. In this way tiny bits have been worn off, as chalk is worn away when rubbed against the blackboard, or slate pencils against the slate. Perhaps some of the soil that you have seen has been made in this manner. Further on you will learn about the glaciers which have caused much of this rubbing.

The grinding of rocks together has made much soil.

But this is not the only way in which rock has been changed into soil. Much of it has decayed and fallen to pieces as wood does. You know that, after a long time, stumps of trees, and the boards in sidewalks, grow so soft that they fall to pieces. Perhaps you have called it *rotting*, but this means the same as *decaying*. The picture (Fig. 1) shows such a stump.

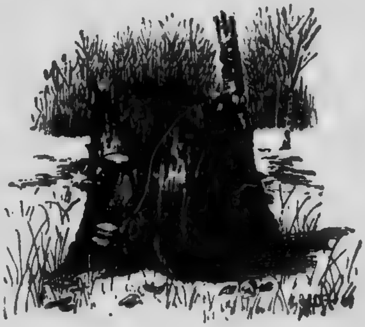

Fig. 1.
A decaying stump of a tree.

Other things even harder than wood decay in much the same way, although perhaps more slowly. Hard nails, at first bright and shiny, decay until they become a soft, yellow rust. Iron pipes and tin pails rust until holes appear in them.

You may not have thought that stones also decay, but they do. The headstones in old graveyards are often so crumbled that the letters can scarcely be read, and sometimes the stones have even fallen to pieces. The decay of stone may also be seen in old buildings, in boulders, and rock cliffs. Have you ever noticed this?

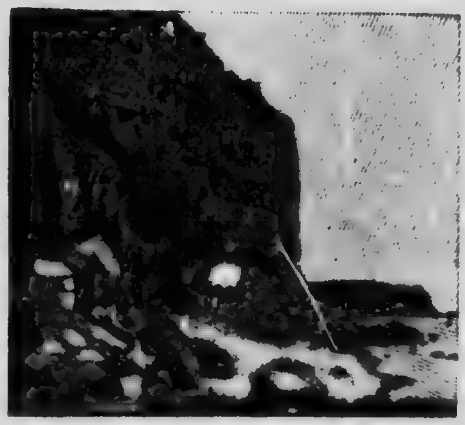

Fig. 2.
On Grand Manan Island, N. B.
A rocky cliff containing many cracks. Point to some of them.

Soil has been formed, also, by the decay of stone.

There are several things that help to cause this decay. All rocks have cracks in them (Fig. 2). Usually some of these are so large that they can be plainly seen; but there are many others so tiny that they cannot be seen without a magnifying glass. When it rains, the water steals into them, and by softening and rotting the rock, very slowly changes it to a powder.

The water may also freeze in these cracks and force the stone apart. If you have seen water pitchers, or iron water pipes, burst in cold weather, you know how this is done. Some of the pieces of stone broken off in this way are very small, others quite large (Fig. 3).

FIG. 3.

Pieces of rock broken from a cliff by the weather. Can you also see the cracks in the rock of the cliff? Find some broken pieces in Figure 2.

Plants help the water in this work. In search of food they push their hair-like roots into the cracks, and there remain until they grow so large that they also pry off pieces.

The earthworms you often see after a heavy rain also help in crumbling the stone. In order to get food, they take soil into their bodies and grind the coarse bits together until they become very fine.

Water finding its way into the cracks causes rock to decay and crumble. Frost assists in this. Plants and earthworms also help to break it up.

Rock changes to soil most rapidly near the surface; for the rain, roots of plants, and earthworms can reach it more easily there than elsewhere. So the deeper into the earth one goes, the less change is found (Fig. 4); and, no matter where you live, if you should dig deep enough, you would come to solid rock.

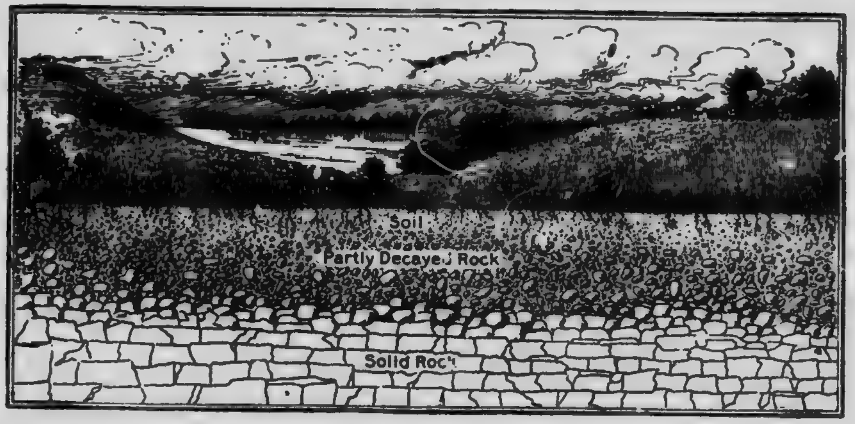

FIG. 4.

A section, as if the earth were sliced through, like a loaf of bread is cut, so that the part below the surface is seen. Tell what you see in this picture. Notice the roots of the tree on the left side.

Figure 5 shows soil about one and one-half feet deep. Sometimes there is much more than this, and men may

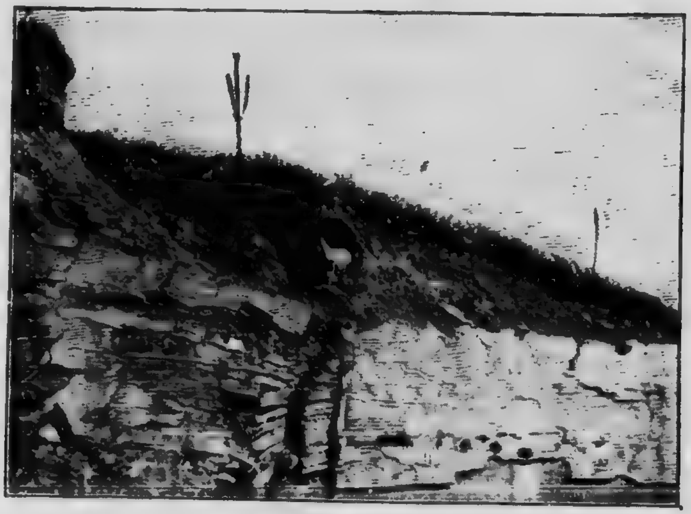

FIG. 5.

A picture showing solid rock beneath the soil. Notice the cracks in the rock.

even dig deep wells without finding rock; but in many places there are only a few inches of soil, or, sometimes, not even enough to hide the rock.

One reason for such differences in the depth of soil is that some kinds of stone decay more easily than others. Another reason is that in some places the rain washes the bits away as fast as the stone crumbles. This may leave the rock quite bare in one place and make the soil very deep in another.

There is solid rock beneath all soil.

How different it would be if no rock had ever changed into soil! There could then be no grass, flowers, or trees around your home, because they grow by means of the food that they get from the soil.

Without grass there could be no cattle, horses, or sheep; in fact, few animals such as are found upon the land could live; for what would they eat? What, then, could you yourself find to eat? There would be no vegetables, no bread, butter, and milk, and no meat. You see that, if there were no soil, few people could live; so that the soil under our feet is a very valuable substance.

Without soil, few plants, animals, or people could live on the land.

Soil is needed by plants because it holds water. They become thirsty as well as you. Where the soil is only a few inches deep, it may dry out on hot summer days, and then the plants die; but where it is deep, the roots may reach down several feet till they find damp earth.

It is surprising how long the roots of some small plants are (Fig. 6). For example, the clover in the picture is less than a foot high, but its roots are longer than you are tall. They reach so deep down that even in dry weather the clover is green while other plants, with shorter roots, are withered and dry. Some trees push their roots down a greater distance still. Can you find out how long the roots of any weeds are?

The soil holds food, as well as water, for plants. In it is found something which plants need, and which they take up through their roots; it is a part of the soil itself, and is called *plant food.* Each blade of grass and each limb of a tree contains some of it; and when a piece of wood is burned, some of this food is left behind in the ashes.

Every person even has a quantity of it in his body; your bones and teeth are partly made of it. But you did not take it directly from the soil; the plants took it for you, and you received it from them in flour and other foods that you have eaten.

Soil furnishes water and food to plants.

All plants do not need the same kind of food any more than all animals do. Horses eat hay and grain, while dogs eat meat; so some plants need one kind of food, and some another. These different kinds of plant food are found in the different kinds of soil, of which there are very many.

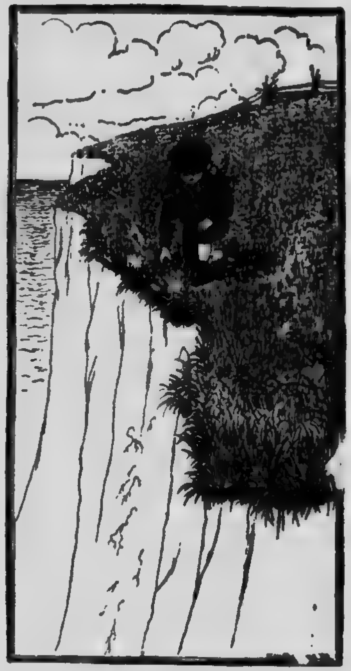

FIG. 6.

Some of the roots of the clover that the boy is picking have reached out into the air through the side of the bank. They were seeking water.

For example, some soils are fine, while others are coarse, because some rocks have crumbled to finer bits than others. Then, too, there are many kinds of rock, such as granite, limestone, and sandstone; and when they decay they make different kinds of soil.

In some places great numbers of plants have grown up and died. During their growth they took substances from the air, as well as from the soil, and when they died and decayed they returned some of these to the soil. These plant remains have become mingled with the soil, making it dark and sometimes almost black. In some places this dark-colored layer may be several feet deep, as in forests, or in swamps, where plants have been growing and decaying for hundreds of years. This is an excellent soil for farming, because it contains much plant food.

There are many different kinds of soil.

Soil that has much plant food in it is said to be rich or *fertile;* if it has little it is said to be poor or *sterile.* The plants are taking away some of this food; they are really robbing the soil. But when weeds and trees fall and decay on the spot where they grew, they pay back what they took away. In fact, some of this food is returned to the earth every autumn when the leaves fall from the trees.

But if plants are carried away from the spot where they grew, there is danger lest fertile land shall be robbed of so much plant food that it will become sterile. Now this often happens; for farmers send away their wheat to make flour, and haul the most of their grain and hay to market. Some farmers have done this for so many years that they are no longer able to support their families on their land, but have been obliged to move away to find other farms where the soil has not been robbed of its plant food.

The wise farmer takes care to put some plant food back upon the soil to pay for what he has taken, so that he may continue to grow good crops. That which he puts back upon the soil is called a *fertilizer,* because it keeps the soil fertile. People in the city often use a fertilizer to feed the grass of their lawns and keep it green.

Fertile soil may be robbed of its food and become sterile.

II. HILLS

THE soil that has been formed from stone has not been left smooth and level like a floor. The surface of the land is usually uneven or rolling; and even those places which at first sight appear level, are really sloping (Fig. 7). Besides such gentle slopes, there are many others steep enough to allow coasting in winter, and others still that are much too steep for this purpose. In other words, *hills*, some gently sloping, some steep, are found almost everywhere upon the surface of the earth (Fig. 8).

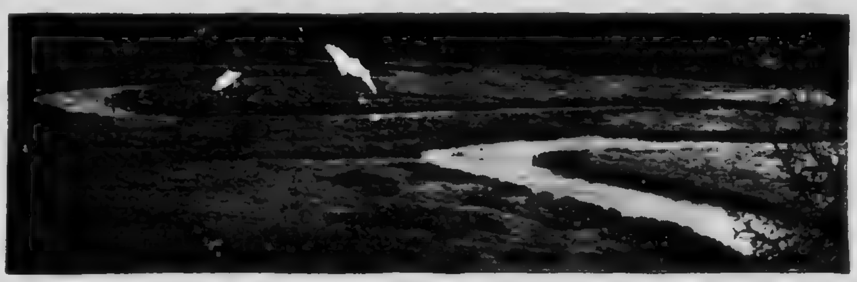

FIG. 7.

A very level plain; but, as a stream is flowing through it, there must be slope.

These hills have not always been here. Even the ones you may have seen and climbed have been slowly made. Let us see what has caused them.

When it rains slightly, the water soaks into the ground and disappears; but when there is a heavy rain, all of the water cannot sink into the soil as rapidly as it falls. Some then begins to flow away. One little stream, perhaps hardly an inch wide, begins at one point; another joins it; quickly several of them unite, and soon a good-sized brook or creek is formed. Have you not noticed this flowing water in the school yard, in the roads, and on the sides of hills?

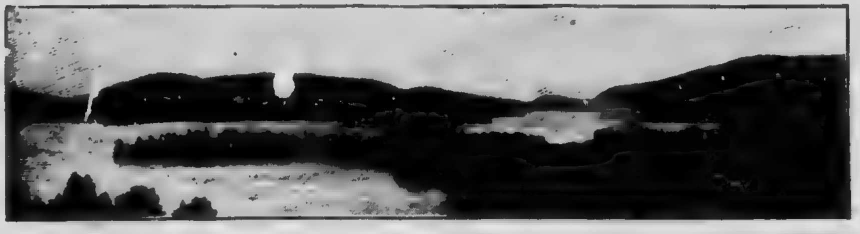

Fig. 8.

A picture of a hilly country. The surface of the lake is level; but the hills, some steep, others gently sloping, are very irregular.

But did the water flow off without taking something with it? Was it not muddy? This means that soil had become mixed with the water and was being borne away. Every heavy rain bears along much soil, cutting out little channels, washing out roads, and perhaps even destroying the beds of railways, so that trains must stop running for a time.

During such a rain little channels, or *valleys*, and tiny *hills* and *ridges* are carved in the soil (Fig. 9). No doubt you have seen these formed very many times. If not, you can easily make them by pouring water from a sprinkler upon a pile of loose dirt.

There are many heavy rains every year, and in a lifetime their number is very large. During many hundreds of years, then, the water could wash away an enormous amount of soil and rock which the large streams and rivers would carry away to the sea. By this means deep valleys have been formed, leaving hills between them, much as the tiny channels in the school yard are cut in the earth by the rain water.

Then, also, some rocks are not so hard as others, and the softer ones, as they break up, are naturally carried away faster than those that are harder. This leaves high ground where the rocks are hardest.

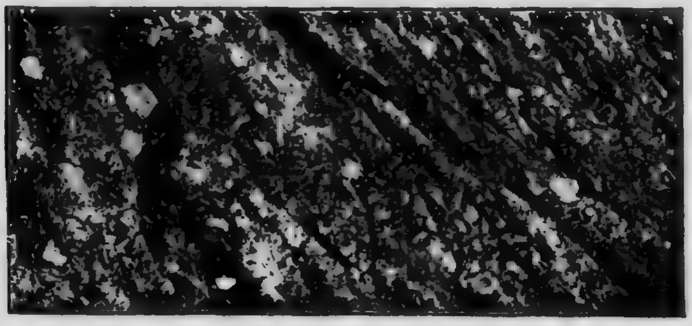

FIG. 9.

Little hills and valleys cut in the soil by heavy rains. Point to some of them.

What a change water must have made in the appearance of the surface of the earth! No doubt, in the very beginning there were hills and valleys; but every year, for thousands of years, these have been slowly changing, so that they are now very different from what they were long ago. And after many more years they will be very different from what they now are, for they are changing even now.

Most hills have been carved out by running water.

In every neighborhood there are hills, although they may not be very high. The picture shows one with a somewhat gentle slope

(Fig. 10). If a person were to walk up this hill, going from its *base* to the top, or *summit*, he would walk more than a mile; but this, of course, does not mean that the hill is a mile high.

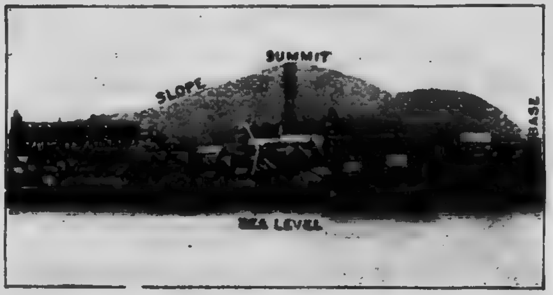

Fig. 10.
To show the difference between the slope of a hill and its height.

For example, in Figure 11 you see a board ten feet long, with one end resting on the ground and the other on a fence four feet above the ground. If a person starts at the lower end and walks to the upper end, he travels ten feet; but he is then only four feet above the ground.

The height of a hill is much less than the length of its slope.

Perhaps you have heard that it is colder on the summit, or *crest*, of a high hill than at its base. If one takes a thermometer with him when going to the top of a hill

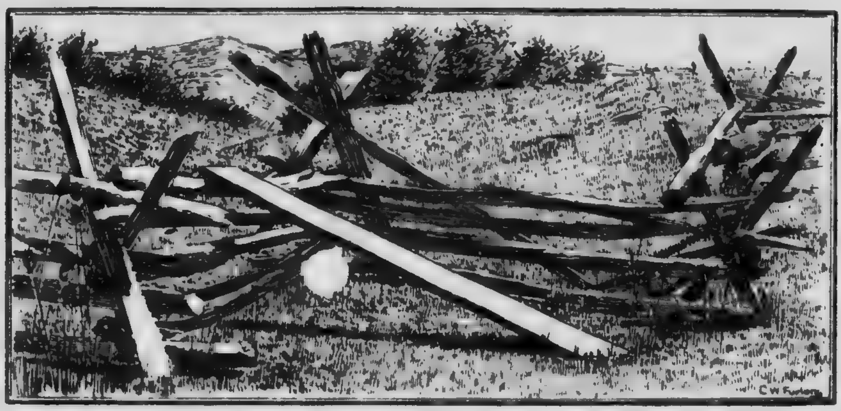

Fig. 11.

which is 300 feet high, he finds that it is about one degree colder at the top than at the bottom. One might not notice any difference in climbing low hills, but it can easily be noticed on high ones; and if your home is near one, you can prove this.

People who live where there are high hills often observe that it snows upon them while it rains upon the lower ground at their base (Fig. 12). Explain why this is so.

It is colder at the crest of a hill than at its base.

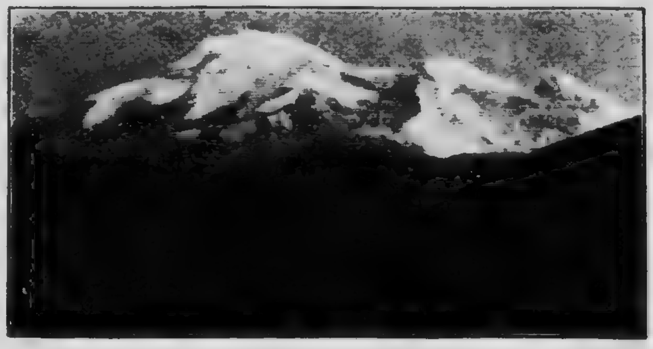

FIG. 12.

Do you see any reason for thinking that it is colder near the summit of this high mountain than at its base? This is Mount Chimborazo in South America, where it is very hot in the lowlands.

Many people prefer to build their houses upon hills, partly because the air is cooler and fresher in summer; but another and more important reason is, that it is more healthful to live on this high ground. Where the land is low, the slope is often so gentle that the water cannot flow off readily, so it stands, sometimes making wet places called *swamps* (Fig. 33). Houses in such places often have cellars and foundation walls that are damp, and the people who live in them are in danger of fever, and of other kinds of sickness caused by this dampness.

But the water usually flows quickly away from a hill, so that even after a heavy rain the ground soon becomes dry. In large cities, where land is very expensive, people build almost anywhere; but in these cities there are so many drain pipes, or *sewers*, to carry off the water, that even the low places are quite dry.

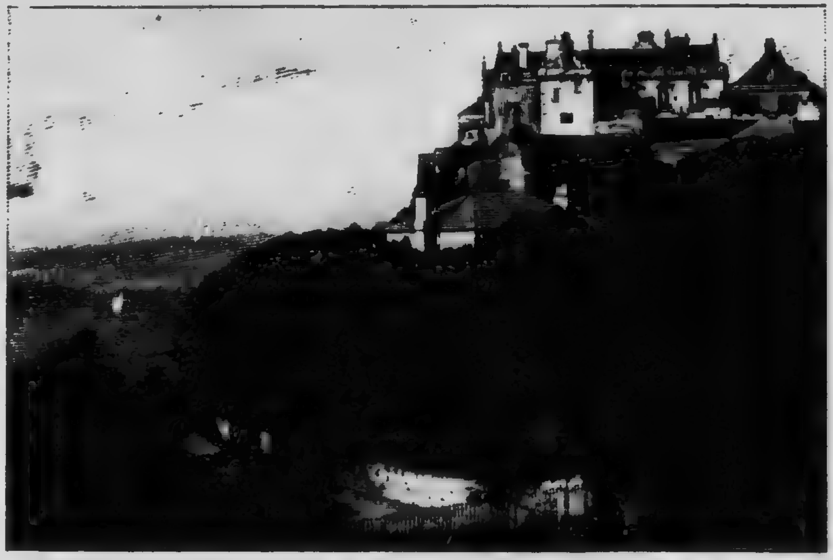

FIG. 13.

A castle built upon the brow of a high hill. Describe the view from there.

In times past some men were in the habit of building great castles with thick walls, on the crests of hills (Fig. 13). From these they could look out over the country for a long distance and spy approaching enemies in time to prepare for them. Then, too, the steep sides of the hills were difficult for the enemy to climb, so that the people living in castles on hilltops were quite safe.

Some of the Pueblo Indians built their towns upon the tops of steep hills in order to be safe from the more savage Indians who attacked them. For much the same reason the Puritans, many years ago, were in the habit of building their churches upon the hilltops.

Hills at present are little needed for such a purpose; but there is another reason why people like to live upon them. From their tops they can look out over the fields for long distances and enjoy the beautiful views. Have you yourself ever enjoyed such a view?

People like to build their houses upon hills, because it is healthful there and the views are beautiful.

III. MOUNTAINS

YOU may never yet have seen mountains, but you have certainly seen something that looks much like them Often, on a summer evening, the sun sets behind great banks of clouds that reach far up into the sky. Some of them have rough, steep sides, and great, rugged peaks,

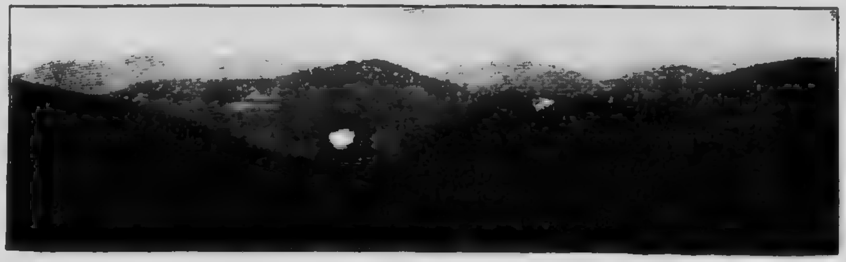

FIG. 14.

A scene among the White Mountains.

while others have more gentle slopes, and rounder tops. Oftentimes there are many of them together, and they are so real that it seems as if one might climb their sides if he could only reach them.

This is very much the way snow-covered mountains appear in the distance; in fact, the resemblance is so close that, when one is at a distance from mountains, he must often look carefully to note whether he is looking at real mountains, or only at clouds in the sky.

The mountains in Fig. 14 are much like hills except that they are larger. Hills are seldom more than a few hundred feet high, while these mountains rise two or three thousand feet in height. Some mountains are so low, and their slopes so gentle, that one is able to climb to their tops without much trouble. Such mountains are often called hills. But many others are even two or three miles in height. Their *peaks* rise far above the clouds and are often wholly hidden by them, as in Figure 15.

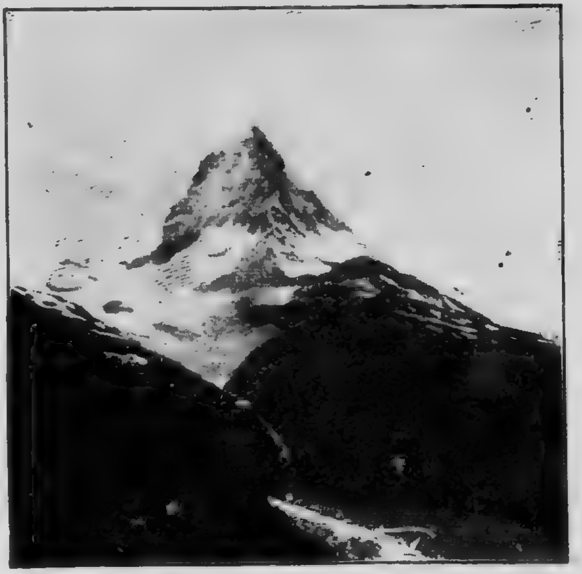

Fig. 15.

A mountain peak in Switzerland, with snow on its sides and base, and a small cloud hiding the very summit.

Usually where there is one mountain peak there are others near by (Fig. 16). They often extend a long distance, perhaps hundreds of miles,

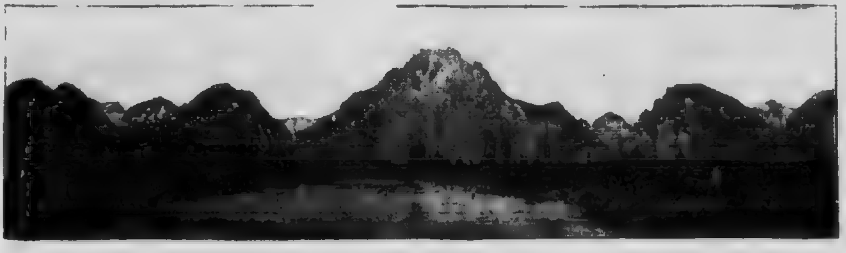

Fig. 16.

A number of lofty mountain peaks near together.

forming what is called a *mountain chain*, or a *mountain range*.

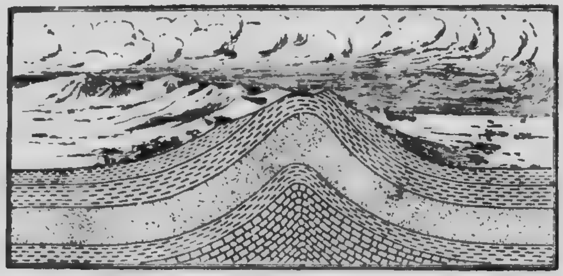

Fig. 17.

This is a drawing of a mountain range sliced through so as to show the layers of rock that have been pushed upward.

Such great ranges have not been carved out by running water, as hills have been. In fact, real mountains are found only where parts of the land have been slowly raised or pushed upward until they are as we see them to-day (Fig. 17). Among these mountains, as elsewhere, running water has of course cut out many valleys.

You can imitate mountain folding by crumpling a number of sheets of paper. The reason for this folding of the rock layers will be found stated on page 15, part II.

Mountains are masses of rock that have been pushed above the level of the surrounding country.

Men often climb to the tops of mountains. It might seem that this would not take a very long time, nor be very difficult; but to go to the crest of even a low mountain is often quite a task. Upon a level road one can easily walk a mile in less than half an hour. But it might require a whole day of steady climbing to reach the summit of a mountain only one mile high.

It would be a long journey even if one could go in a straight line to the top. It has already been stated (page 12) that to climb a hill two or three hundred feet high it is necessary to walk a longer distance than this. The same is true of mountains.

Most mountains are so steep that one would grow very tired climbing directly up their slopes; so a much longer, zigzag path is usually followed. Then, too, there are often steep *cliffs* or *precipices*, that could not be climbed (Fig. 18), and one must travel round these to find a place where the slope is gentle. This makes the path still longer, so that to climb a mountain one mile high it might be necessary to walk ten miles, or even more.

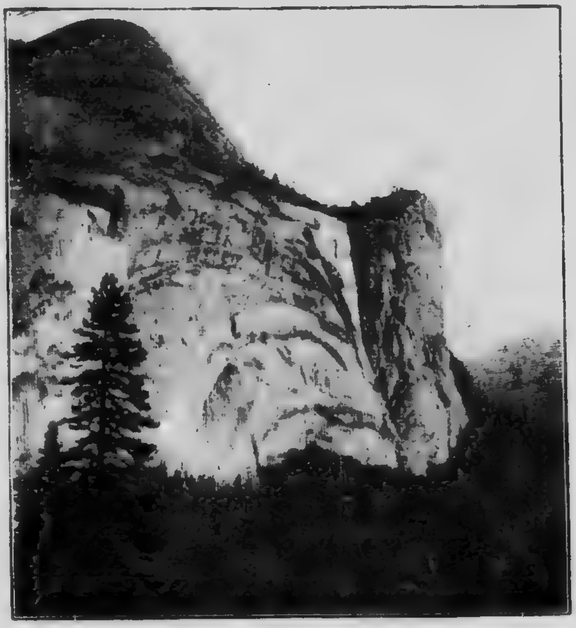

FIG. 18.

A mountain precipice in the Yosemite Park, among the Sierra Nevada Mountains of California. No one could possibly climb the face of this steep rock cliff, which is about 4000 feet high.

If the air is colder at the top of a hill than at its base, one might expect that it would be *very much colder* on the top of a high mountain, and this is true (Fig. 12, p. 13). In fact, it grows so much colder near the summit of the higher mountains that it *never* rains there, but snows instead; and it may even be so cold that trees cannot grow there (Fig. 20, p. 22).

It is a long distance to the top of a high mountain, and the air is cold there.

Many people cross the ocean to visit the Alps Mountains in Switzerland; but while they enjoy climbing about on the sides, and looking at the beautiful views, very few ever reach the summit of the higher peaks. Mont Blanc is one of the best known of these, and is nearly three miles in height. (The picture, Fig. 20, shows views of Mont Blanc.)

It is very difficult, and even somewhat dangerous, to climb to the summit of this mountain. When a person wishes to do so, he must employ guides to help him over the difficult places.

The round trip usually takes two nights and three days; as there is no place to obtain food high up on the mountain side, it is necessary to carry it. Overcoats and blankets are also necessary; for even though the journey be made in the hottest summer weather, it will be bitterly cold upon the mountain top.

Suppose that we are making such a journey. We start early in the morning so as to have a long day. Each of us carries a few light articles, but the guides and porter carry most, for they are strong and used to climbing.

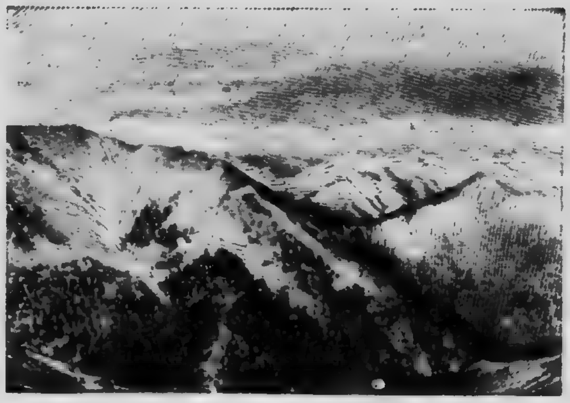

Fig. 19.

A picture of the timber line on the snowy slopes of the mountains in Yukon Territory, looking eastward from the east side of the Yukon River.

At first we walk along a pleasant path in a beautiful wood. A house is occasionally passed (Fig. 20, G), and perhaps a green field. But soon there are no more houses and fields, and the trees become smaller and smaller, until the line is reached above which it is so cold that no trees can grow. This is called the tree line or *timber line* (Fig. 19).

From this point on, no plants larger than bushes are seen, and after a while even these disappear. Meanwhile the soil and the grass have become more scarce, while here and there banks of snow are found in the shady hollows. Soon we have climbed to the *snow line.* This is the line above which snow is found all the year round. Now, no matter in what direction we look, rock and snow are everywhere to be seen, the latter often being hundreds of feet deep (Fig. 20, F).

What a beautiful view is before us! It repays us for all the hard work. We look down upon the woods through which we have just passed; then, over beyond them, to the deep valleys, with the green fields, pretty houses, and villages far below us; and, beyond these, to the other steep mountains upon the opposite side of the valley.

The guide takes his place in front of us, and often tells us to stop while he goes ahead to examine the way. It may be that the snow has bridged over and hidden a deep and narrow chasm, so that if one were to step upon this snow he might fall through.

Sometimes the guides lift one of us over a dangerous place; and, when it is steep or slippery, fasten all the members of the party together with ropes (Fig. 20, E), so that if one falls, the other may hold him.

As we advance higher and higher, it is often necessary to take a narrow path on the steep side of the mountain. On the right you can look hundreds of feet almost directly downward; on the left are great stones and masses of snow almost directly overhead.

The snow sometimes falls, forming snow slides or *avalanches*, which are very dangerous. They come tearing down the sides of the mountains with a terrible roar, burying whole villages beneath them. You have seen the same thing, on a much smaller scale, when snow has slid from the roofs of houses on warm winter days.

After one night spent in a little house about halfway up the mountain side, and after much hard work on the next day, we reach the summit (Fig. 20, A) Here, in spite of our wraps, we are all shivering; for upon high mountain summits there are fierce winds which seem to go through even the thickest cloth.

On this barren mountain top there are no birds, no trees, no grass: nothing but snow and rock; but if it is a clear day, and there are no clouds clinging to the mountain sides below, we may be able to look down into the beautiful green valleys, only a few miles away. There the birds are singing, flowers are blossoming, and men, working in the fields are complaining of the heat.

It is a difficult and dangerous journey to the top of a high mountain.

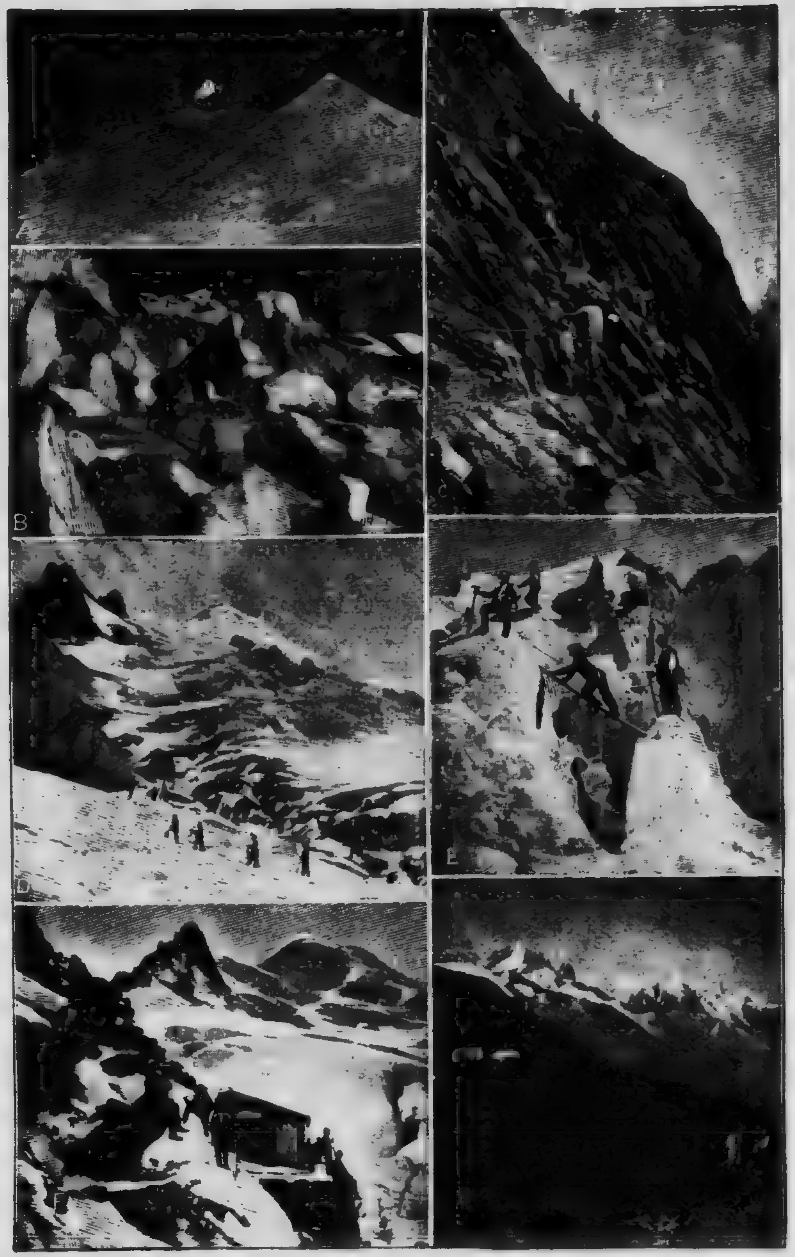

Fig. 20.

Seven photographs taken on a journey to the summit of Mont Blanc. See if you can find in these pictures any of the scenes described.

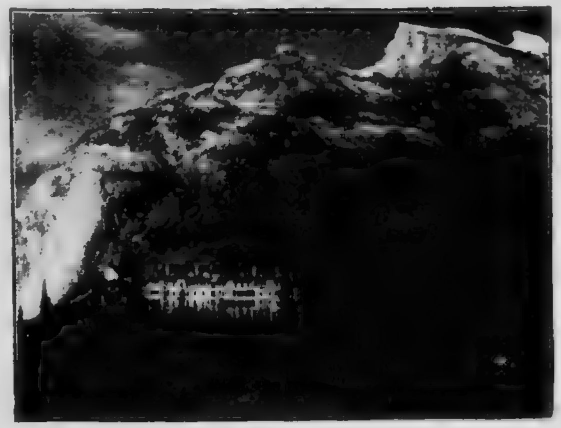

Fig. 21.

A hotel at the base of a lofty mountain at Banff, on the Canadian Pacific Railway, in Alberta, N.W. Territory.

It is by no means so difficult to reach the summits of all mountains. Many of them (Fig. 14, p. 16) are so low that there is no snow upon them in summer, and trees live and thrive even at the top. Roads may have been made to the summit, so that one may drive up instead of walking.

Among some of these mountains hotels are built (Figs. 21 and 24), to which people go in summer to escape the hot weather. There they may walk through the woods, and climb to many interesting places, where fine views are to be had.

Mountains are important summer resorts.

Fig. 22.

Entrance to the Van Winkle Bar gold mine, near Lytton, B.C. Here men are digging gold ore deep in the mountain side. The ore is brought to the surface and crushed, so that the particles of gold can be extracted.

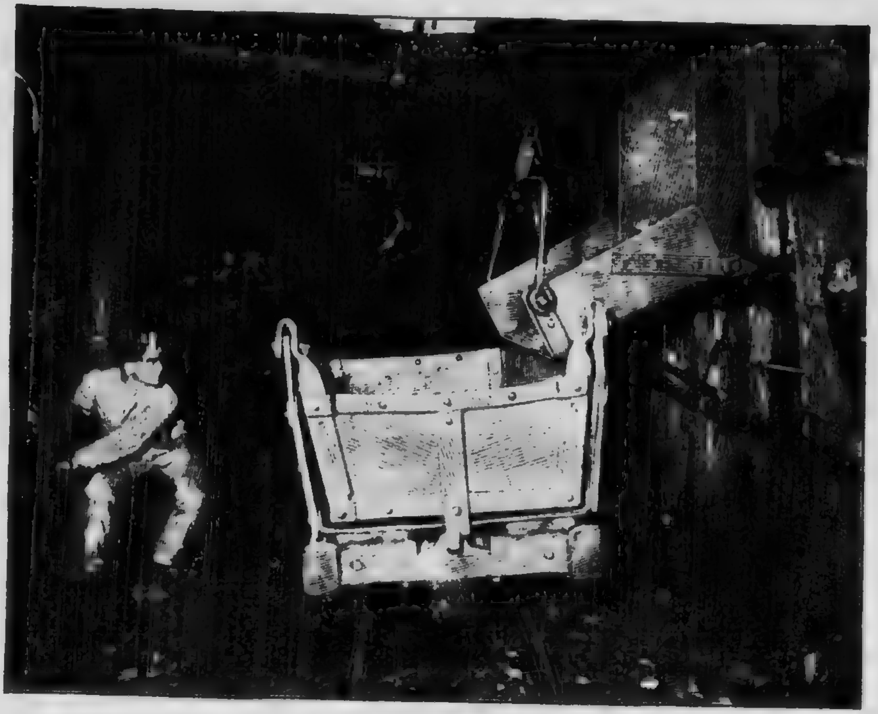

FIG. 23.

This man is deep down in the earth in an iron mine. He is preparing to load the car with ore which has been dug in a tunnel just above.

Perhaps you already know that the rocks inside the mountains sometimes contain gold and silver (Fig. 22). Iron, lead, and other *metals* are also found there. When they are dug out from the rocks they are *ores*, which do not look much like these metals as we know them. But the metal in the rings, watches, and silver coins that you have seen, and even the iron parts of your school desks, may have come from the rocks of some mountain (Fig. 23).

The trees in the mountain forests are also valuable. The most common kinds are evergreens, such as the pine, hemlock, and spruce, which are green even through the winter, and which can live on the cold mountain sides as far up as the timber line.

The land upon a mountain side is usually too steep and rocky for farms. But even where farms are not possible, trees often grow finely, covering the mountain for miles and miles with dense forests. This is an advantage, for the trees may be cut down and sawn into lumber, from which all sorts of wooden articles are made. Possibly the very seat in which you are sitting was once a part of a tree that grew on the side of a mountain.

Mountains are of further use because of the abundance of water that they supply. We have already seen that there is much ice and snow upon some of them; in fact, there is so much upon the higher ones that it can never all melt away, no matter how hot the summer may be.

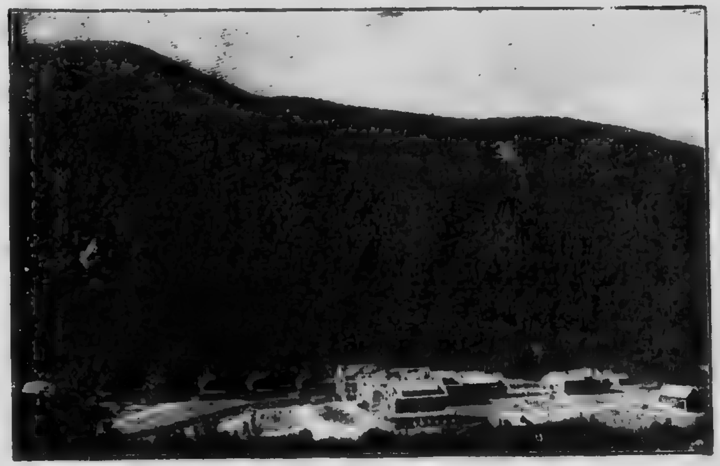

FIG. 24.

The forests on the sides of the White Mountains. The large buildings are the hotels of a summer resort.

During hot weather many streams dry up; but at such times the ice and snow of the mountains only melt the faster, so that the streams which flow forth from these mountains are even more swollen than usual. This water may run along for many miles until it finally reaches towns and cities where people need it to drink. Do you know of any city that gets its drinking water from such a river?

Mountains furnish metals, lumber, and water.

IV. VALLEYS

We have seen how water is always washing away soil, making hills and changing their appearance. Wherever hills are found there are always low places or hollows, and these are called *valleys.*

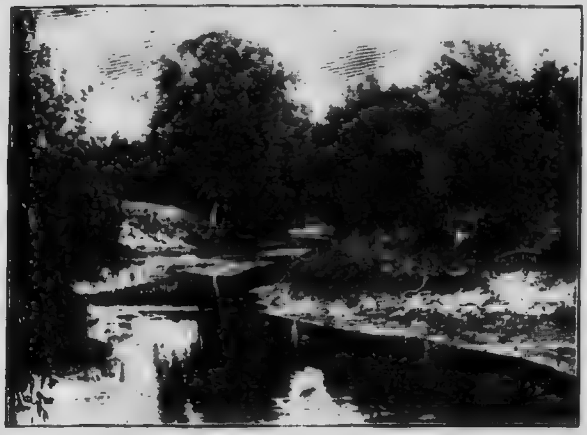

Fig. 25.

A beautiful stream in a wooded valley.

Some very small valleys you have already seen in Figure 9. They are only a few inches wide, and the tiny hills or ridges between them are only a few inches high.

Every stream of water, whether great or small, when flowing over soft earth, is carrying some of it away and forming valleys. Even when flowing over hard rock, the water is doing the same thing, but more slowly. It grinds the rock away by dragging pebbles and grains of sand over it, thus scouring it out. This work of the water is never finished, for every rain is slightly changing the valleys.

Are there any valleys in your neighborhood? Do you live in one? If you have travelled on the railway, you have certainly seen many of them. Figures 11, 14, and 25 show valleys. Can you find pictures of others in the book? In Figure 25 is shown a small stream with the land on either side gently sloping toward it.

Since there are very few places without slopes and hills of some kind, there must be few places without valleys. Although some of these are narrow, others are so wide that one cannot see across them.

Wherever two downward slopes come together, a valley is formed, whether the slopes be long or short. In those that you find, notice the difference in the slopes. If in one of the valleys there is a stream, notice the direction in which it flows. Why does the water flow at all? Which way is *down the valley*. Point *up the valley*.

You see, of course, that valleys have not only width but length. Many of them are only a few inches long, and you can certainly find some of these. Perhaps your home is in a valley that is many miles in length. Find out if this is true.

Most valleys have been cut out of the land by running water.

In the picture (Fig. 26) you see several valleys. Rain falls into each of these, some of it sinking into the soil and some running off down the slopes. Into which valley will the water flow that falls on the top of the ridge?

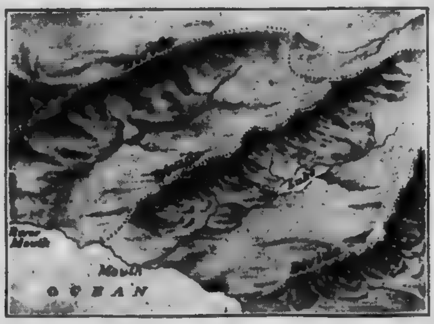

FIG. 26.

The dotted lines show the divides between the valleys. Trace them. What else do you see in the picture?

When it rains upon the roof of a house (Fig. 27), the water is divided along the highest part, some flowing down one side, some down the other. A similar thing happens when water falls on the land. Because the water parts, or divides, at the highest place between two valleys, this place is called a *divide* or *water-parting*, or sometimes a *watershed*. The dotted lines in the picture (Fig. 26) show some divides. How irregular the lines are!

A divide sometimes stands out sharply, as on the roof of a house; but in many places it is difficult to find, for the land there may appear to be flat. Can you point out such a place in Figure 26?

Fig. 27.

A house roof, to show that the water is divided along the highest point.

If you wish to know how wide one of these valleys is, where would you begin to measure? Would it not be from the divide on one side to the divide directly across on the other side? Of course it would, for the divides form the boundaries of the valley (Fig. 28).

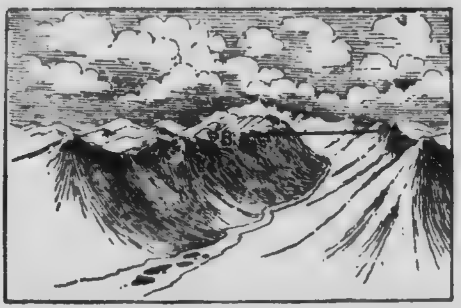

Fig. 28.

The line *A-B* shows the width of this valley. Observe that the valley is much wider than the stream.

A divide or watershed is the highest ground separating two valleys.

While the valleys that one usually sees are both narrow and short, there are some so long and wide that one could not travel their whole length or width, even if he were to spend all day and all night upon a fast train (Fig. 29). One of the most noted in the world is called the Mississippi Valley, which is over three thousand miles long and many hundred miles wide.

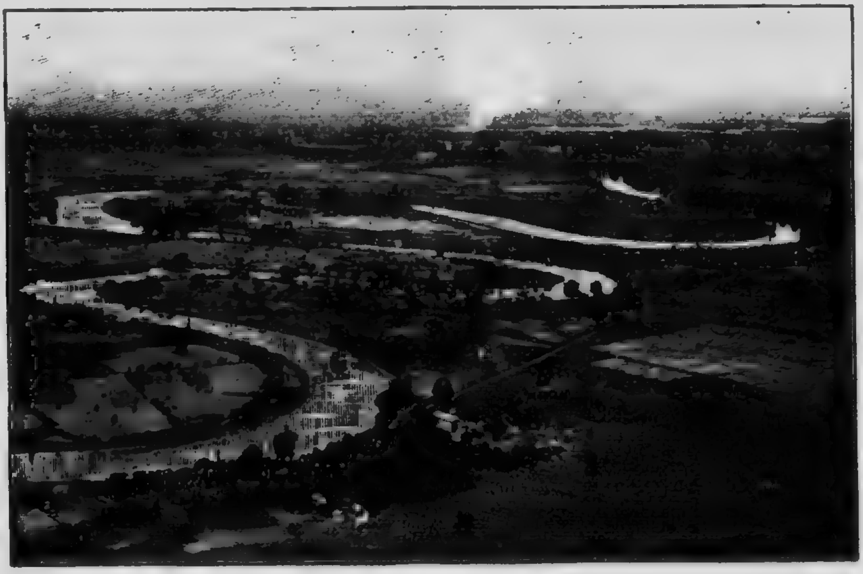

FIG. 29.

Picture of a river winding through a broad and very long valley.

When valleys are so large as this, their slopes must be very gentle. On that account many people who live in the Mississippi Valley scarcely know that they are in a valley. The river flows through the lowest part, and the homes of these people may be so far away that they have never seen it. All about them the land appears so level that it does not seem to form a part of a slope. It is therefore called a *plain.* But when rain falls there, it immediately flows toward the river, thus proving that the plain is a part of the great Mississippi Valley slopes.

Such an immense valley was not cut out by running water. You have learned that hills are made in that way, but that mountains are formed by the rising of great masses of rock. Some of the great valleys, like the Mississippi, have also been made by changes in the level of the land. But even the valleys that have been formed in this way have generally been greatly changed by the water that has run through them.

Some great valleys have been formed by the rising or sinking of the land.

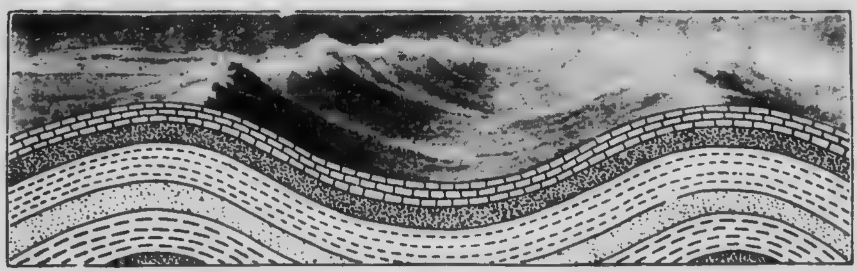

FIG. 30.

A valley sliced through to illustrate how valleys may be formed by the folding of the rock layers.

People generally choose the valleys for their homes. Even among high mountains, where it is impossible to live on the steep and cold sides, they often dwell in the bottom of the valleys. Here they are surrounded by lofty peaks which appear to shut them in almost entirely (Fig. 31).

Hills are often too cool or too steep, or have too shallow a soil for farming. The rains have washed the earth down the steep slopes into the lower part of the valleys, making a deep and fertile soil there. In the valleys, therefore, the best farms are found, with their great fields of corn, oats, wheat, and grass (Fig. 32). In the valleys, also, cattle and horses are raised, many large cities have sprung up, and railways have been built.

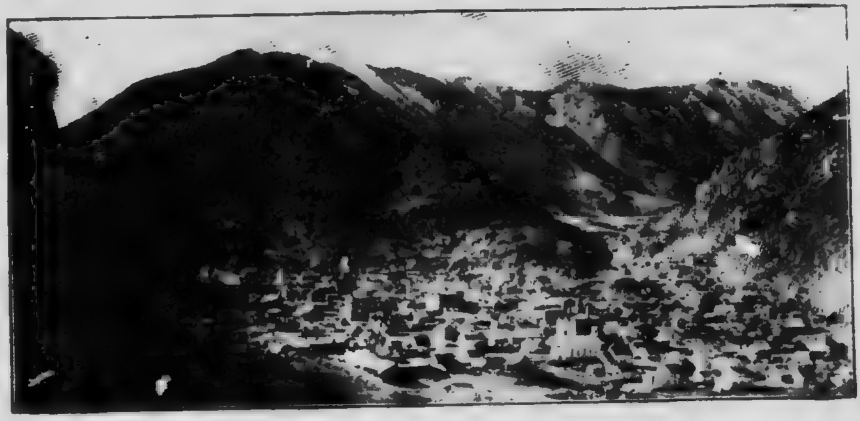

Fig. 31.

A city near some mines in a valley among the Rocky Mountains.

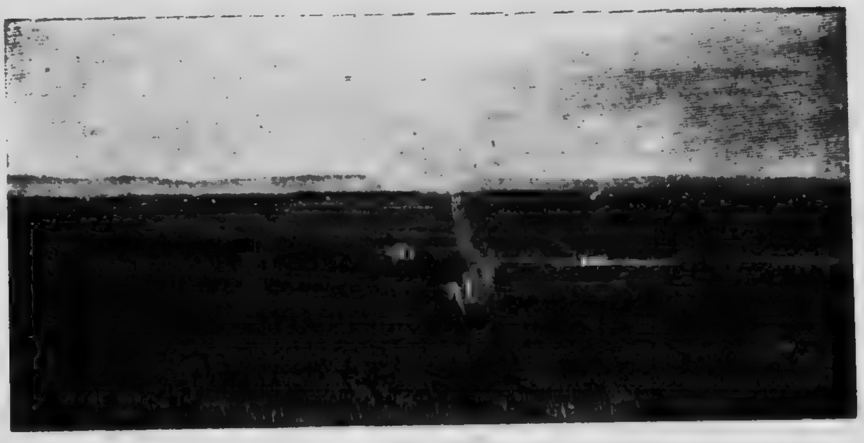

Fig. 32.

Scene in the valley of Grand Pré, a large and fertile valley in Nova Scotia.

Most of the land is really made up of slopes, and we are living upon them. It may not seem that your home is upon one, but it probably is. Your house may even be upon a hilltop, and yet you may be living in a broad valley.

Most people live in some part of a valley.

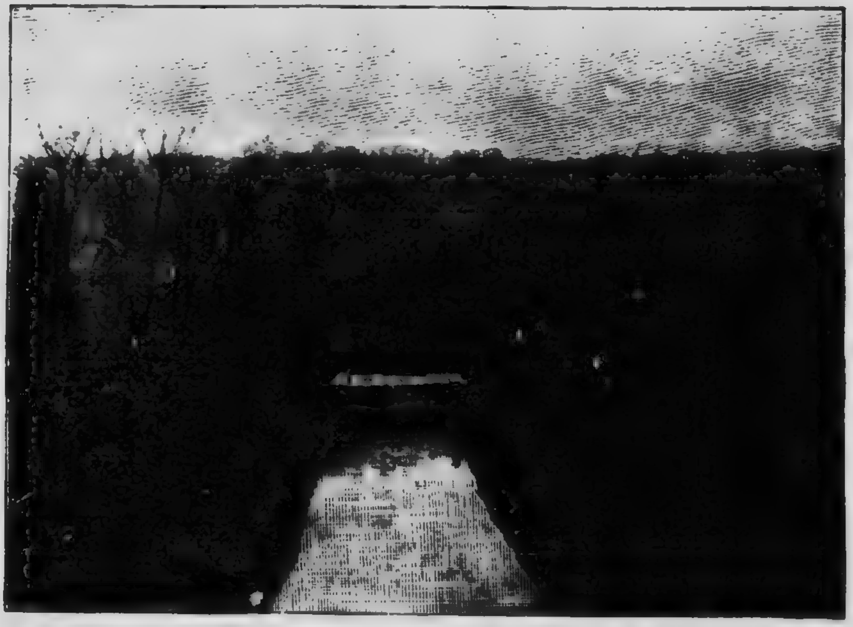

FIG. 33.
A ditch dug to drain a swamp.

The soil is all the more valuable because of the slopes of valleys. Were it not for them the water, after a heavy rain, would stand too long upon the ground. But where there are slopes, down which the water can run freely, it quickly flows off and does not drown the crops or make the region unhealthy for man and animals.

The great importance of this matter is shown when farmers buy land. One of the first things that they inquire about is *drainage*, that is the slopes which allow the water to run off quickly.

If the water does not flow freely away, they even dig channels in order to carry it off. Sometimes these are left open, as in the picture (Fig. 33), and they are then called *ditches*; but, more often, when the channels are small, tiles are placed in the bottom, forming a kind of pipe, and then the earth is thrown back again. Such channels are known as *drains*. The water finds its way into the pipes, through small openings that are left for this purpose, and flows away. Good drainage is so important that men are often willing to incur great expense in order to secure it.

In some places the land is so nearly level that the standing water produces *swamps*. There are thousands of swamps in this country, and great sums of money are spent in digging ditches to drain them. This makes the swamp dry; and since the soil in such places is very fertile, a great deal of land that was once of little value is now changed to rich farms.

The slopes of valleys are valuable for drainage.

Valleys have had a great influence upon the roads of a country. For instance, in going across mountains men generally follow a valley, going higher and higher until they come to what is called a *mountain pass* (Fig. 34), which is nothing more than a valley between mountain peaks. After crossing this, they go down another valley on the other side of the mountain.

Railways also cross mountains through the valleys and over the lower passes; they wind in and out, often making sharp curves in order to avoid cutting directly through the rock.

Even in hilly regions it is usually easier to get from one place to another by travelling in the valleys. In the lower parts, near the streams, the land is most nearly level; but as soon as one attempts to go directly across the country, the roads become rough and hilly.

On that account, when white men first came to this country and settled among the hills and mountains, they built their roads in the valleys, often quite near the streams. Men do the same thing still.

FIG. 34.

The White Pass, over the Rocky Mountains, on the way to the Klondike gold diggings.

Where the country is more level, as upon a plain, it is not so difficult to travel in a straight line; but even in such places both the waggon roads and the railways are often built round a small hill rather than over it.

The location of waggon roads and railways depends on the valleys.

We have seen that hills and mountains afford many beautiful views. But it is not necessary to go to the mountains to see the fine views. You may see them in almost any valley or plain. Even a field of

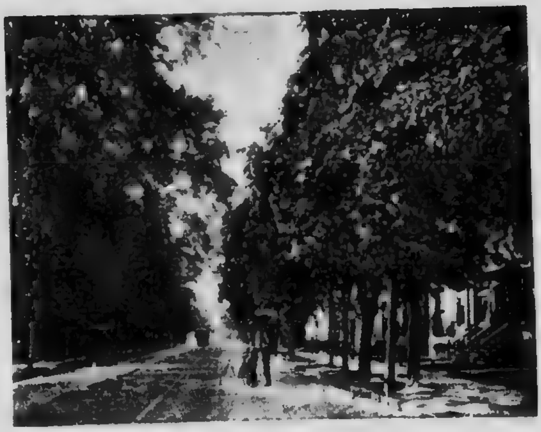

FIG. 35.
A beautiful street scene. Sherbourne St., Toronto, Ont.

green grass, such as may be seen in city parks, and in the country, is beautiful. This is particularly true in the early spring, after the long, cold winter.

Those who live in small towns or cities may find streets where the trees have grown so tall that they nearly meet overhead (Fig. 35). As one looks along such a street, he can scarcely help exclaiming, "What a magnificent archway!"

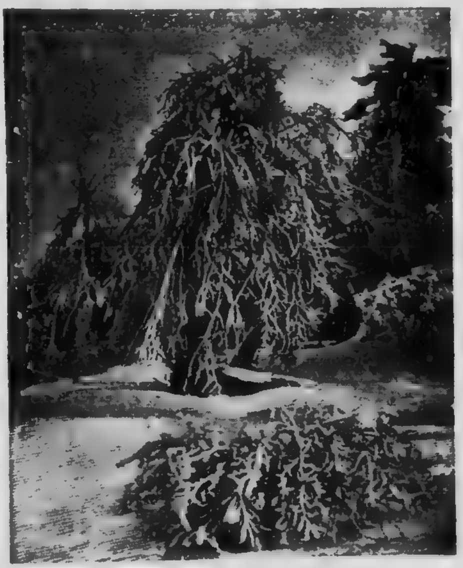

FIG. 36.
A winter scene in Montreal Park, showing the beautiful effects of the branches covered with snow and ice.

In the country, also, there are many beautiful sights, such as the variously colored fields, the waving grain, the graceful trees, and the shady roads.

The views change from time to time. They are not the same at noon as in the late afternoon when the sun is casting long shadows. In the spring the plants are fresh and bright; in the autumn they are prettily colored; in the winter the damp snow clings to the trees, bushes, fences, and houses until everything is robed in white (Fig. 36). Again, the rain freezes to the trees, and when the sun appears, everything sparkles in the bright light as if it were covered with a thousand jewels.

It is not necessary, then, to travel far in order to find beautiful views; they are to be found everywhere, not only among the mountains, but on the hills, in the valleys, in the country and in the city.

The hills, mountains, and valleys are very beautiful.

V. RIVERS

Every heavy rain causes the water to collect, here and there, and flow down the slopes. At first only tiny rills are formed; but these unite to form the little streams and brooks.

In some places a brook is narrow and deep, in others broad and shallow; here it flows swiftly, and there slowly. Place a chip or a boat in such a brook, and it floats quietly in some places, and then, coming to a *rapid*, it is whirled along swiftly and perhaps upset (Fig. 37). Or it may float to a *waterfall*, where the water tumbles down from the top of a ledge, and then it is surely overturned (Fig. 38).

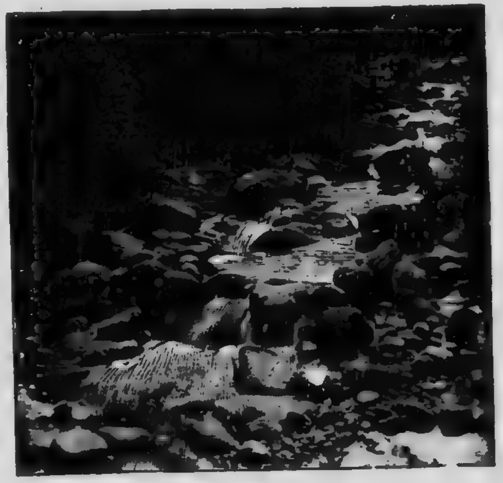

Fig. 37.

A noisy mountain brook, tumbling over its rocky bed.

There are large rivers in the world much like these little brooks, the main difference being in their size. But even such rivers are generally small at their beginning or *source*. Some of the largest have their sources far up in the mountains, where they are so small that a person may easily step across them.

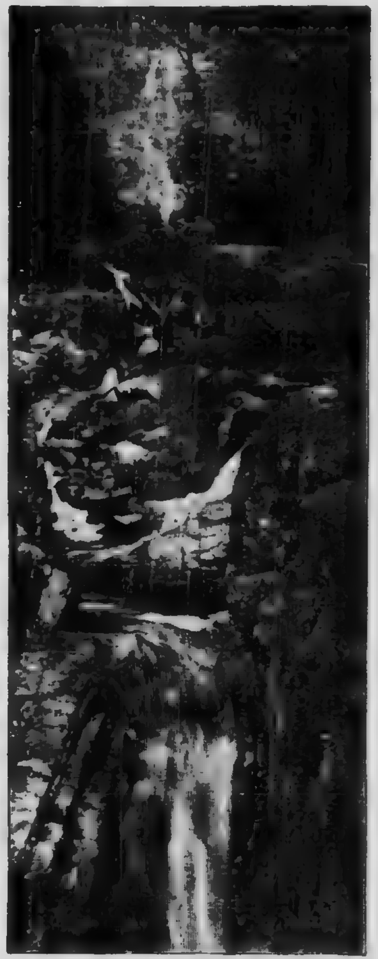

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FIG. 38.

A mountain torrent leaping over the ledges in rapids and waterfalls. Point to one of the falls. Find others in the other pictures of the book.

The water of these rivers may come from the melting snows; and as it dashes along, beating itself into foam by striking against the rocks, it is joined by other streams like itself. Often the water must rush round or leap over large boulders which lie in its path; and often it falls directly downward for many feet with a great roar (Fig. 47).

Great rivers at their source are usually no larger than a brook.

The water of a mountain stream seems to be quite helpless, with the great hard rocks all about it; but it never gives up its struggle with them. Rocky cliffs may reach far up into the sky on each side, and the slopes may be so steep that loose pieces of stone often fall into the water. But the torrent dashes these against one another, and grinds them against its rocky bed, until they are worn into pebbles. These pebbles are borne down stream and are slowly ground up into grains of sand, or even finer still so as to form clay.

If we should travel down such a stream, starting near its source among the wild mountains, we should find it constantly changing. In the first place, it gradually grows larger, because other streams, called *branches* or *tributaries*, enter it (Fig. 39). The *banks* become lower and the river grows broader and deeper. In places there may still be rapids and falls, but the country on both sides is not so steep and rocky as it was among the mountains. Now, houses, farms, and men are seen, and pasture land and fields of grain are on the banks (Fig. 40).

FIG. 39.
Two streams, the Allegheny and Monongahela, uniting to form the Ohio River.

At first, the slope of the *stream bed* was so great that the river hurried along faster than you could run. Now the water no longer flows rapidly enough to drag boulders or even pebbles; but it can still carry the sand and mud brought by the rain from the soil of the hillsides.

It has now been many days since this water left the

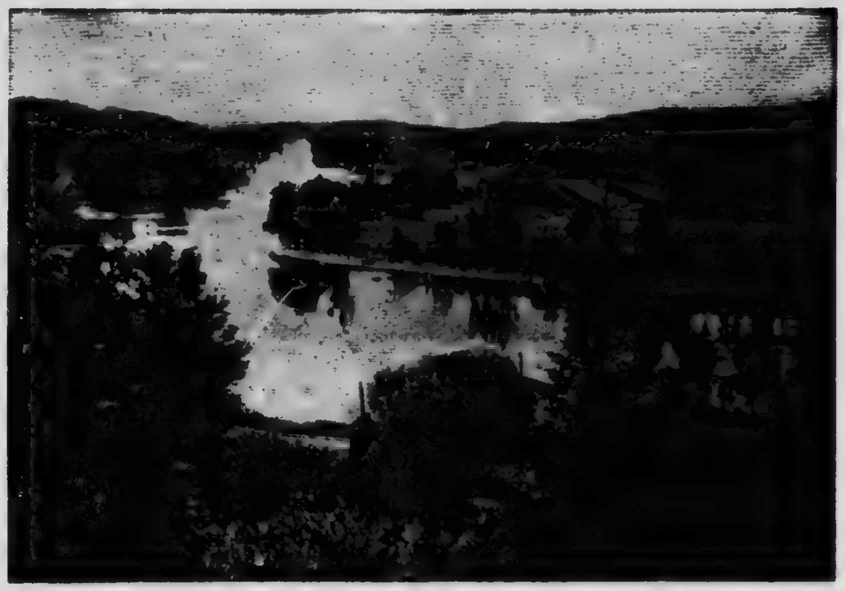

Fig. 40.

The St. Francis River in Quebec, flowing through a splendid farming country.

mountains. The river has become so wide that a long bridge is needed to cross it (Fig. 41), and so deep that one cannot touch its bed even with a long pole.

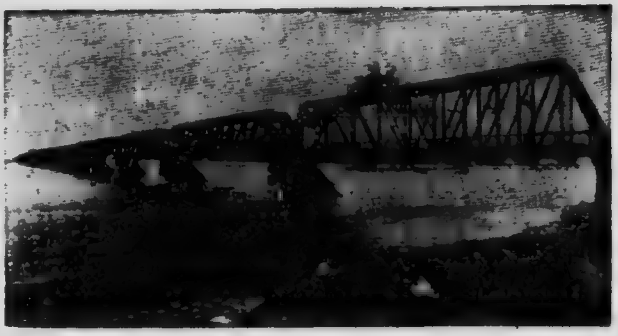

Fig. 41.

The Victoria Jubilee Bridge across the St. Lawrence River at Montreal. Notice how small the train of cars appears on it. This will show how long it is.

At last, perhaps weeks after it started, the water approaches the ocean; and now the downward slope of the river bed is so gentle that the *current* cannot drag even grains of sand; but it still carries fine bits of rock-mud with it. These bits, or particles, may be so tiny that if you were to place some of the muddy water in a glass, it would take hours for all of them to settle and leave the water clear. When the river enters the quiet waters of the ocean, even this mud, or *silt*, settles.

We have followed the river from the *source* to the *mouth* where it empties its waters into the great ocean. At first it was a little stream, but by the addition of water from many tributaries it has grown larger and larger, until at its mouth it may be miles in width.

A great river is broad and deep at its mouth, and its current is very slow; but it carries fine particles which form a sediment even to the ocean.

We have been considering a large river that had its source in the mountains; but others are much smaller, and many do not start in the mountains. Some empty their water into other rivers, being tributaries, and others enter lakes rather than the sea. They may also have low, soft banks instead of high, rocky ones, and there may be no rapids and falls. But no matter where their sources and mouths may be, or what other differences may exist, they are, in many ways, much like this river.

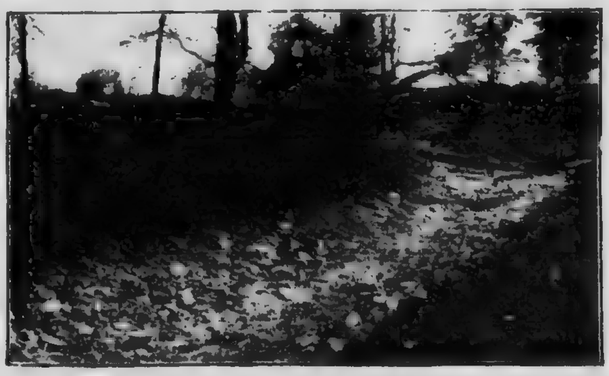

FIG. 42.

A pebbly brook bed which is filled with water when the rain falls or the snow melts, but is often dry in summer.

Where does so much water come from? Taken up from the ocean, it falls from the sky in the form of rain or snow. But we all know that small streams dry up and disappear soon after a rain. Even large brooks may become quite dry in summer (Fig. 42). Why, then, do not great rivers also dry up?

One reason is that many rivers have a constant supply at their sources. That this is true of a stream starting in a high mountain is clear, because we have seen (p. 25) that the snow in such places never entirely melts away. It is also true of streams that have their sources in lakes and swamps.

Then, again, all the rain-water does not flow off; some sinks into the ground. There is a great deal of water in the ground, and it is this that men find when they dig wells. This underground water trickles through the soil, and through crevices in the rocks, often bubbling forth as a *spring*, weeks after it has fallen as rain somewhere else. Most large rivers are supplied with water from hundreds and even from thousands of such springs.

It is to be remembered, too, that a great river, with its many tributaries, flows through a very large tract of country, so that when it is not raining in one part, the rain may be falling in another. Thus, while one tributary carries little water, heavy rain may keep others full, and this flows into the main stream, preventing it from drying up. Still, even the largest rivers are affected sometimes by an abundance of rain, or by the want of it.

If a heavy rain falls, or if the snow melts rapidly, so much water may flow into a river that it rises and overflows its banks (Fig. 43). Those who live near such streams are in danger of being drowned by the floods, and in some places men have built banks of earth, called *levees*, to keep the water from overflowing the towns and farms.

The supply of river water comes from rain or melting snow, from lakes and swamps, and from underground.

Every one has seen muddy water flowing in gutters, or in rills on the hillsides. Great quantities of soil are washed away in this manner, as has been shown (p. 10). But what becomes of it all?

If you have seen a sidewalk or a field flooded with water, you perhaps remember that when the flood disappeared, a thin layer of fine mud was left. This mud was carried along by the current until it reached a place where the water stood almost still, then it slowly settled. The same thing will happen if some muddy water is allowed to stand in a glass for a time. Try it.

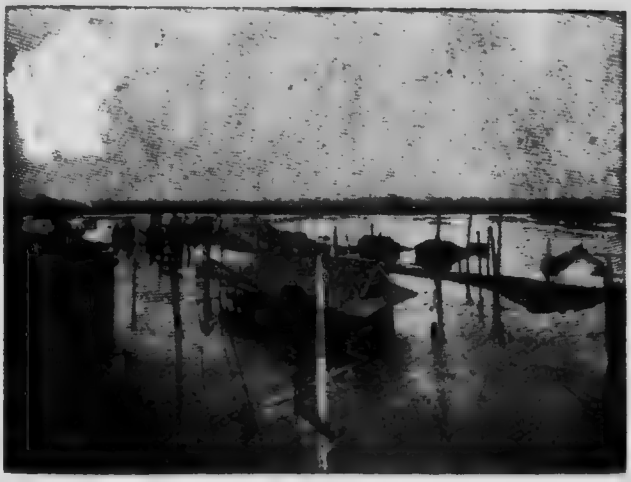

FIG. 43.

Photograph of a river flood on the Grand River, at Brantford, Ont., which has covered the railway tracks. Tell what you see in this picture.

In much the same way, when there is a river flood (Fig. 43), the water spreads out on both sides of the river in a great, thin sheet, flowing slowly along and depositing a thin layer of mud. Each flood adds a layer, making the land higher, until, after many years, it is lifted considerably above the usual level of the river. Such land is generally a level plain; and since it is made by river floods, it is called a *flood-plain.*

Many pieces of land have been made in this manner, and you have perhaps seen some of them. Near the banks of streams the valley is often flat, and the hillsides that bound the bottom of the valley begin to rise at a considerable distance from the water (Fig. 44). This level land is usually a flood-plain. Near small streams such plains are generally narrow; but in the Mississippi and Nile valleys the flood-plains are many miles in width. Farmers like this soil because it is very fertile.

Some of the sediment carried by rivers forms flood-plains.

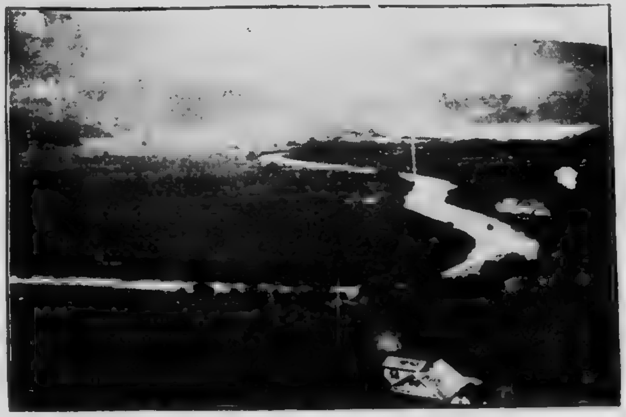

FIG. 44.

A small flood-plain between steeply sloping valley sides.

Much of the sediment is carried on until it reaches a lake or the ocean. Here, opposite the river mouth, the water is generally quiet, so that the mud sinks to the bottom. At first only enough sediment is deposited to form low, swampy land; but this is gradually lifted higher and higher, by layers of mud from each flood, until it becomes high enough to make dry land.

These plains at the mouths of rivers form what are called *deltas* (Fig. 45). Many streams have such wide deltas that one cannot see across them, most of what has formed the sediment having come from fields, hills, and mountains, perhaps hundreds of miles away. The surface of the delta is a plain, because it cannot be built any higher than the floods themselves have reached.

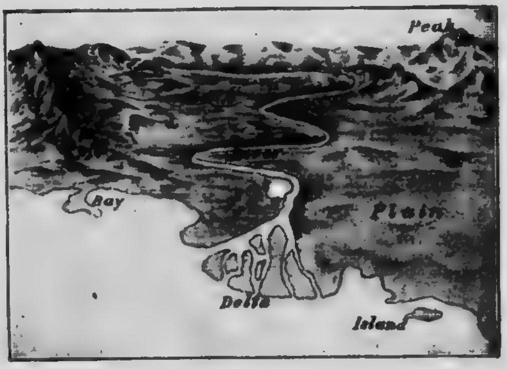

Fig. 45.

This picture shows a river delta. What else do you see in the picture?

From year to year more sediment is deposited, and the land is built farther and farther into the water, so that deltas are constantly growing. The slope of the river bed is usually so gentle that all the water cannot flow out in a single channel. For this reason it enters the sea through several arms, cutting the delta into several parts.

Some of the sediment deposited by rivers forms deltas at their mouths.

A river entering the sea may receive water brought by hundreds of tributaries. Thus the rain that falls in places even hundreds of miles apart may at last be brought together in a single main stream. Such a main stream with all of its tributaries is called a *river system* (Fig. 46). For instance, we speak of the St. Lawrence River system, meaning the St. Lawrence, Great Lakes, and their tributaries.

All the country which is drained by a single main stream is called a *river basin*. Thus all the land drained by the St. Lawrence River is included in the St. Lawrence basin.

One should not think of this as a true basin. A real basin, as a wash basin, has a rim extending all around it. The rim of a river basin is the divide; but there is no divide, or rim, near the mouth of a river, since the water runs out into the sea. If it were a true basin, with a rim all around it, the water would collect and form a lake.

All the land the waters of which are drained by a single river is called a river basin, and all these streams together form a river system.

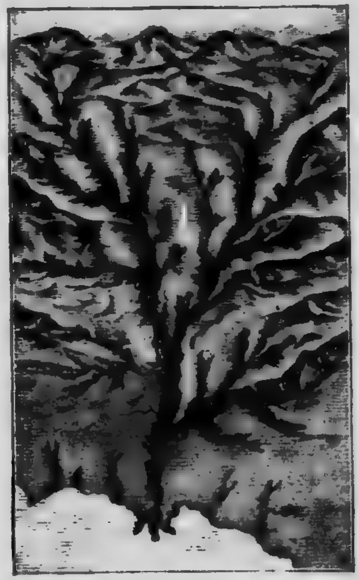

Fig. 46.

Picture of a river system and river basin. Point to some of the tributaries; to their source; to the mouth; to the delta.

Some ways have already been mentioned in which rivers are of much use. They build flood-plains and deltas, thus making some of the most fertile land in the world. Rivers also furnish water to plants, animals, and man.

On page 6 it was shown that plants sometimes wither during hot weather, because the soil is dry. But near rivers the soil is usually kept so moist that plants grow well even in dry weather.

There are some places in the world where there is not enough rain for crops to grow. The people in such regions sometimes lead the water out of the rivers into ditches, through which it flows for long distances. Then it is allowed to spread out over the thirsty soil, so that plants may thrive. This guiding of water is called *irrigation*, and in some places no crops can be grown without it.

Many people and animals depend on rivers for all the water they use. Even whole cities obtain their drinking water solely from rivers.

Streams not only bring water where it is needed, but they also carry it away when it is not wanted. A river is really a great ditch for draining the land, so that whenever the snow melts rapidly, or a heavy rain falls, the rivers quickly remove the water. They also carry off the filthy water, or sewage, of many towns and cities.

Rivers supply water where needed, and remove it when not wanted.

The water of rivers is also used for turning wheels to help in the making of many articles, such as cloth and flour.

You have perhaps noticed how windmills work (Fig. 68). The *wind* blows the large wheel round and round, and it is so connected with other wheels that it can pump water, or grind corn, or turn a saw for sawing wood. Likewise *steam* is used to turn the wheels of a railway engine, so that it drags the heavy cars along.

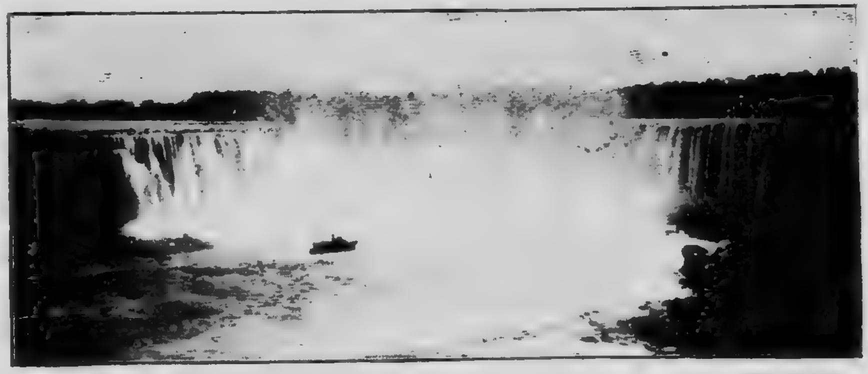

FIG. 47.

Niagara Falls, the greatest waterfall in the world, 160 feet high, from which many streams are drawn to drive wheels on both sides of the river. These are of great power, and must be enclosed in very strong buildings, and so are out of sight.

River water is made to do work in much the same manner. Where there is a swift current, or where there are falls, as the Niagara Falls (Fig. 47), it is often easy to run some of the water off to one side through a canal or pipe. The water, racing rapidly along, strikes a wheel (Fig. 102) and makes it whirl round. This wheel, being connected with others, causes them to turn also, much as one wheel in a clock causes another to revolve.

Thus machinery is set in motion by which logs are sawed into lumber, grain is ground into flour, cotton is made into cloth, and many other kinds of work are done.

The water that furnishes the power to turn the wheels is called the *water-power*, and the buildings in which such manufacturing is carried on are called *factories* or *mills.*

In many places the river water does not flow fast enough to strike a wheel with much force ; water-power is found mainly in rivers with swift currents, and especially near rapids and falls. Here mills have been built, and then cities have sprung up (Fig. 105, p. 111).

Rivers also supply water-power for manufacturing.

There is still another way in which rivers are extremely valuable. It has always been difficult to find a convenient means for carrying goods from one place to another. In some places there are no roads ; and even where there are they are often hilly, rough, and muddy.

Yet most of the articles that we use every day, like sugar, flour, oil, meat, coal, lumber, and clothing, have been carried long distances, sometimes thousands of miles. Even if the roads were excellent, it would take a great deal of time, and cost much money, to bring these things in waggons. To carry them by railway takes less time, but is expensive.

A broad, deep river, or a lake, which is a river dammed up (p. 51), is really one of the finest roads in the world. To be sure no waggons or cars can be drawn over it, but boats move there with ease. A river or lake boat can carry as much as scores of waggons or cars (Fig. 48), and many may be going and coming at the same time, so that a large river or lake is equal to several railways: it costs little, too, to keep it in repair.

For these reasons carrying goods by boat upon rivers and lakes, or *inland navigation*, is a very important business. Indeed, it is so important that in many places broad ditches, called *canals*, have been cut in the soil and rock in order to carry goods by boat (Fig. 108, p. 114).

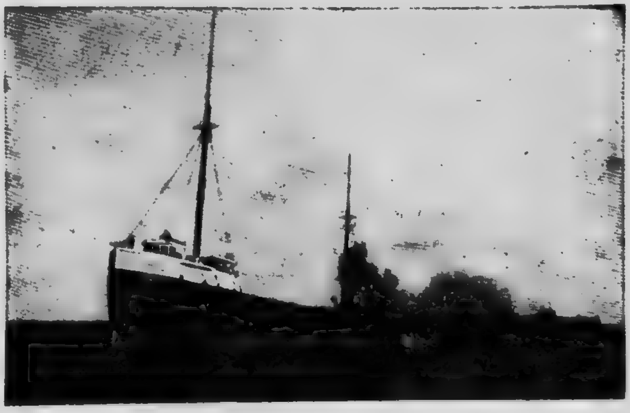

FIG. 48.

On Lake Huron. A steamer carrying a heavy load, towing a barge also heavily loaded, through the lakes and rivers of the St. Lawrence system.

Before the railways were built, — which is no longer ago than when your grandfathers were boys, — boats were used for carrying all sorts of articles from place to place. Even to-day, when there are so many good waggon roads and railways, it is cheaper to carry grain and other products on boats than in cars, and this is often done.

We see, then, why many people have preferred to build their homes near rivers. A farmer prefers to live near a good waggon road, or near the railway station, so that he may easily send his produce away; and, for the same reason, people have always liked to live near a river, which is a good road or *waterway*. It is mainly on this account that many of the large cities of the world stand on the banks of large rivers. Do you know of any such cities?

Rivers are also of value for navigation.

VI. PONDS AND LAKES

Rivers supply towns and cities with water, and also turn the wheels of factories ; but some streams become so low in summer that they lack water for these purposes. To prevent this difficulty men often build dams of wood, earth, or stone across the rivers, and in this way collect sufficient water to make ponds (Fig. 49). When the rivers are high, these ponds are filled, and enough water gathers to last through the dry season.

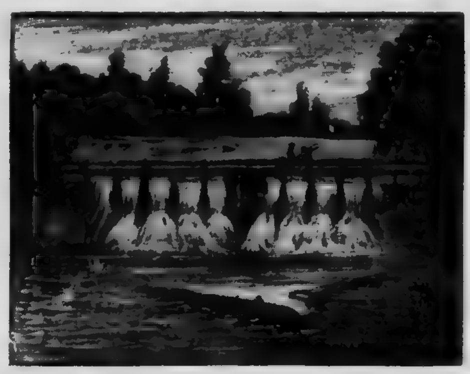

Fig. 49.

A mill-dam on the Humber River, near Toronto.

Probably you have seen such a pond as this. Or you yourself may have made small ponds by building dams of mud or leaves across brooks and gutters.

Lakes may be made in a similar manner, for they are like ponds, only larger. Sometimes they are several hundred miles in length, and perhaps one hundred miles in width. Some of the largest in the world, the Great Lakes between Canada and the United States, were made by dams formed ages ago, across parts of the great St. Lawrence River system.

Most ponds and lakes have been made in much the same way. That is, the water has gathered behind dams across streams.

But in most cases these dams have not been built by men. Beavers have made a few of them. There used to be a great many of these little animals in this country, and some are still left. Since they prefer quiet, shallow ponds in which to live, they gnaw down trees and build dams with the logs; then they build their homes in the water thus collected (Fig. 50).

FIG. 50.

Beavers building a dam across a stream to form a pond, or beaver-meadow as it is called.

In other places, where the sides of a valley are steep, great masses of rock and earth have sometimes fallen, in the form of avalanches, and blocked or dammed the streams.

Also it was stated (p. 18) that the earth has been warped or bent upward in some places, forming low ridges, or even lofty mountain ranges. In this way the ground has sometimes slowly risen across river valleys, making high dams, as on the Niagara River; in such cases large lakes have been formed.

There are many other ways in which dams have been built, especially by means of glaciers, which you will study about in due time.

Most ponds and lakes have been formed by dams across valleys.

Since a lake is generally a part of a stream, it is evident that water must flow into it. The river that flows into a lake is called the *inlet*, and that which flows out is called the *outlet*. There are also many streams entering from the sides. Each of these brings mud and fine sand, which settle in the lake, slowly filling it. At first deltas are built opposite to the stream mouths; then, in time, the whole lake is filled and changed to a swamp. Many a swamp is really the last stage in what we may call the life of a lake.

The surface of a lake appears to be level; but one part is really slightly higher than the other, otherwise the water would not flow out of it. The higher part of the lake, near the inlet, is called the *head of the lake*, the lower part, near the outlet, the *foot of the lake*. It is correct, then, to speak of going up or down a lake, just as we speak of going up or down a river.

Some lakes have no outlets, because there is so little water that the basin cannot fill up and overflow. This has a very peculiar effect upon the water, for in time it becomes salt. Probably you have heard of the Dead Sea and the Great Salt Lake of Utah. These are salt lakes of this kind, and no one would drink their water, even if he were dying of thirst.

But why do such lakes become salt? There is some salt in all water, even in that which we drink, although so little that we do not notice it. When water flows into a lake, the salt is carried with it. If there is no outlet, the salt can go no farther; but each day some of the water is changed to vapor and carried away in the air. As the particles of salt cannot go off in this way, they remain, and increase in number, until, in time, the water becomes so salt that we have a *salt lake*.

Most lakes have inlets and outlets; but some, having no outlets, become salt.

The land at the margin of a river is called the *bank*, but that along the margin of a lake is called the *shore*. In one place the lake shore may be low and wet, and overgrown with swamp plants. In another it may be pleasant to walk upon, being formed of sand and pebbles brought there by the waves. This kind of shore is called a *beach* (Fig. 51).

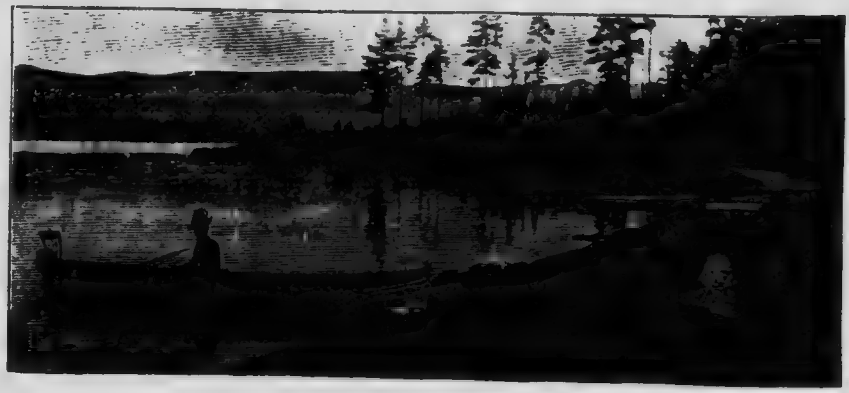

FIG. 51.

A sandy beach on a lake shore.

Many lake shores are regular, but many more are irregular. In some places points of land, called *headlands*, extend into the water (Fig. 52). If small, these are called *points* or *capes*; if large, *peninsulas*. A narrow neck of land joining two larger pieces is an *isthmus*. Bodies of land entirely surrounded by water are known as *islands*.

The water that is partly shut in between two headlands is called a *bay*. When a bay has deep water, and is so nearly surrounded by land that vessels can enter it and

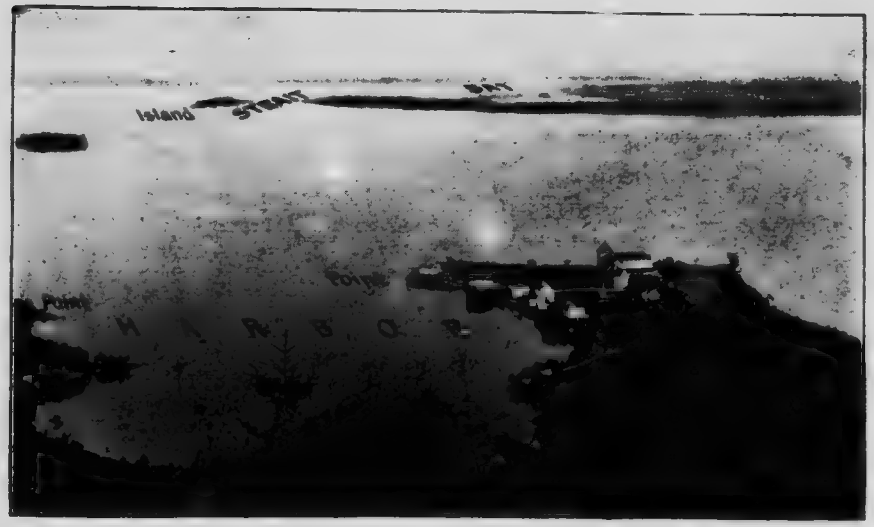

Fig. 52.

A view on Moosehead Lake. Learn what each of the names means.

be protected from the wind and waves, it is called a *harbor*. A narrow strip of water connecting two larger bodies of water is known as a *strait*.

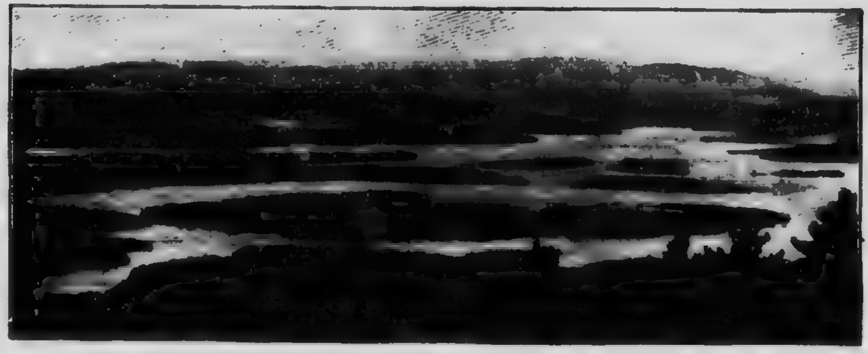

Fig. 53.

How many of the features just mentioned can you find in this picture? Find some also on Fig. 60.

When the water gathers behind a natural barrier or dam to form a lake, it enters many valleys, forming bays and harbors, with capes and perhaps islands between. This is the chief reason for the irregular shores of many lakes. If you will make a little valley in clay, with two or three tributaries entering, then put a dam across it and fill it with water, you will see just how this is done.

The shores of lakes are often irregular, producing bodies of land and water of many shapes.

Ponds and lakes are useful in many of the same ways as rivers are. They help to keep the ground moist; they furnish water to cities, and they supply water to turn the wheels of factories. Besides this, many valuable fish are caught in lakes, and much ice is cut from their surface.

Again, like rivers, lakes are important waterways (p. 48). Upon large lakes, like the Great Lakes, hundreds of vessels are going and coming, carrying men, grain, coal, lumber, and countless other things. On this account many people have settled on the shores of large lakes; and, as a result, many towns and cities have been built there. Can you tell of any?

The shores of lakes are often very beautiful, and many persons go to them in summer to hunt, fish, and canoe. There are hotels there, too (Fig. 52), and some lakes are important summer resorts.

Lakes supply drinking water, water-power, fish, and ice. They are also useful for navigation and for summer resorts.

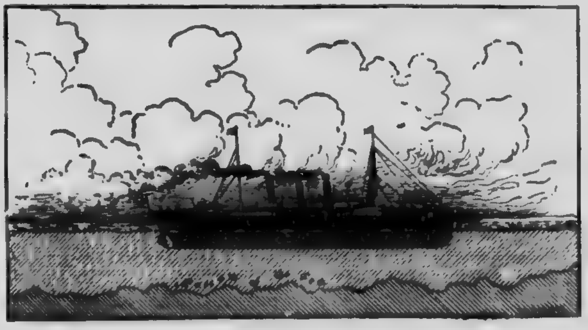

FIG. 54.

A picture to show how deep a vessel sinks in the water.

How are vessels loaded with goods? And again, how can these cargoes be unloaded? Waggons may be driven beside a railway car, and be filled or emptied speedily. But a large boat sinks down many feet into the water (Fig. 54), so that if it came near the shore, it might strike the bottom and be wrecked.

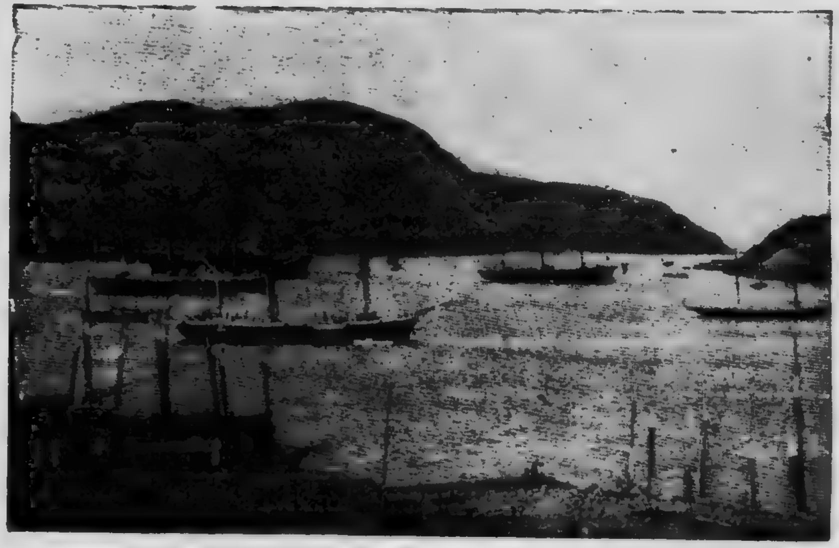

Fig. 55.

Harbor of St. John's, Newfoundland. Note the narrow entrance, through which vessels can pass, and lie in safety at anchor or alongside the wharves, secure from the fierce storms of the Atlantic Ocean.

Fortunately, here and there along the shore, there are small bays or harbors with deep water. The opening is large enough for vessels to enter easily, but small enough to keep out the fierce waves. Here we have a fine *harbor* (Fig. 55).

From the shores of the harbor men build piers of wood or stone, called *wharves*. These reach into the deeper water, where ships may be fastened or *moored* to them. Waggons can be driven on to the wharves, so that this forms a convenient and safe place for loading and unloading vessels. Such a harbor often determines the situation of a city.

Fig. 56.

A view of Southampton Harbor, on Lake Huron, showing a breakwater built in a place where the coast has no natural harbor.

Large cities are sometimes found on parts of a lake shore where there are no such natural harbors. In that case harbors have to be *made*, even though it is expensive to do so. Walls of rock, or rows of posts driven deep into the ground, are built in such a way as nearly to enclose a body of water, very much as capes enclose the water of a natural harbor. Such a wall is called a *breakwater* (Fig. 56), because it breaks the force of the waves, and prevents them from entering the space within.

When a harbor is not deep enough for vessels to enter, it is necessary to dig out, or dredge, as it is called, the dirt and rock from the bottom. This has often to be done in the inlet and outlet streams of a lake.

Harbors are places where vessels find safety from storms and where cargoes are loaded and unloaded with ease.

VII. THE OCEAN

THE great rivers, starting as tiny brooks, grow into larger and still larger streams, until, after days and perhaps weeks, they mingle their waters in the ocean. No doubt much of the rain falling in your neighborhood finally reaches the sea in this way; and if you could float along upon it in a light boat, in time you too would reach the ocean. How large is this body of water, and what are some other interesting facts about it?

FIG. 57.

A view of the great ocean. Notice the sailing vessel in the distance on the right-hand side.

We can see across most lakes, and can sail across even the largest in a day or two; but the ocean is far larger. One could sail upon it in a straight line for weeks without coming to any land (Fig. 57). It is so great that it surrounds all the land on which people live, and no matter in which direction you might travel, if you went far enough you would come to it.

If you were to set out to reach the ocean, the journey might last many days. It might be necessary to go up hills and across valleys, to pass around lakes, and possibly over great ranges of mountains. You would be surprised to find how much land there is, and how many farms, villages, towns, and cities there are.

But there is far more water than land. In fact, the water covers about three-fourths of the earth's surface and the land only one-fourth. If one were to travel entirely around the earth, he would probably spend much more than one-half of his time upon the ocean.

The ocean is so immense that the great rivers in all parts of the earth pour their water into it. Their mouths may be thousands of miles apart, yet the sea stretches far enough to reach them all.

The water of the ocean is too salt to drink; but river water is fresh. Since there are many thousands of rivers entering the sea, would you not expect that their water would make the ocean less salt? It does do so near the mouths of great rivers; but soon it becomes mixed and swallowed up in the salt water. This is another way of showing the size of the ocean, for all the river water that enters it is not enough to make it fresh.

The salt water of the ocean surrounds all the land.

Different parts of the ocean have different names. For instance, the *Atlantic* Ocean is the part lying between Canada and Europe, where the British, French, German, and other peoples live. We buy many articles from these countries, such as woollen cloth, knives, silks, and carpets; and they likewise purchase other articles from us, such as wheat, timber, meat, and dairy products. The way to reach these people is to cross the Atlantic Ocean. The fastest steamers need five or six days for the voyage.

In all parts of the earth the ocean is a great highway. It is so large that thousands of ships are travelling upon it in all directions, carrying people, cattle, grain, fruit, iron, different kinds of machines, and many other things. Although there are so many ships, the ocean is so large that one ship may sail for many days without meeting another.

Ocean navigation is therefore a great business, and many thousands of men are engaged in it. Most of the ships used are larger than the vessels upon lakes, and they sink deeper into the water (Fig. 58). Very large ones, when loaded, reach down about thirty feet below the surface.

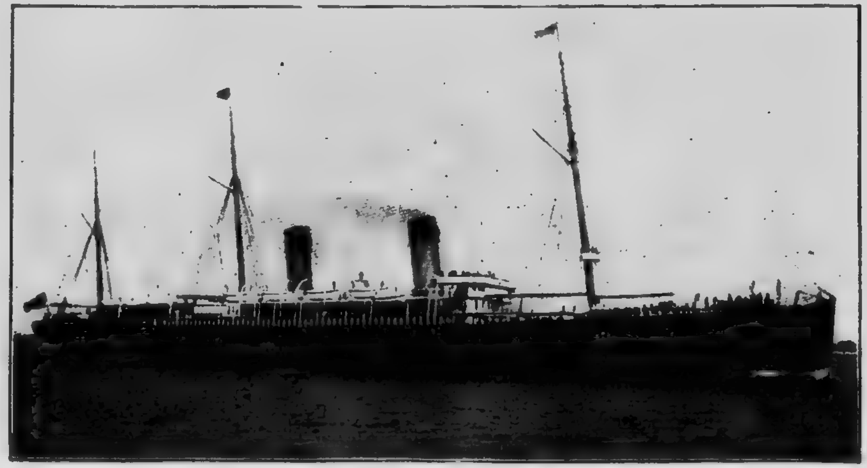

Fig. 58.

A large ocean steamer, one that sails between America and Europe, that will carry as much freight as 500 railway cars. See how small the men appear.

Of course the ships meet with storms upon the ocean, as upon lakes. In fact, the ocean waves are at times so high that they sweep over and almost cover up the largest vessels (Fig. 59).

The coast of the ocean resembles the lake shore in having capes, peninsulas, islands, isthmuses, straits, and bays

(Fig. 60). We have learned (pp. 18 and 30) that the land in places has been raised or lowered. When it is lowered near the seacoast, the water enters the valleys and partly covers the land, as it does in lakes (p. 56). This of course makes an irregular coast.

FIG. 59.
Ocean waves during a storm.

Naturally, on such an irregular coast there are harbors

FIG. 60.
A picture of Bras d'or Lake on the Island of Cape Breton. Here the land has been lowered so that the salt water of the ocean has entered the valleys, covering their bottoms, but leaving the hilltops as islands, capes, etc.

which large vessels enter, and in which they are safe from storms. For example, Halifax harbor is so broad and deep that many ships (Fig. 113) are found in it at all times, either loading or unloading their cargoes, or waiting for storms to pass.

Goods are brought to Halifax across the Atlantic Ocean, not only from Europe, but also from all parts of the world. It is quite possible that the coffee and sugar which are used on your table, and the bananas and oranges which you have eaten, were brought over the ocean and unloaded in this harbor. So, also, at the harbor of Vancouver, in British Columbia, tea and silk and other articles are brought from China and Australia across the Pacific Ocean (Fig. 61).

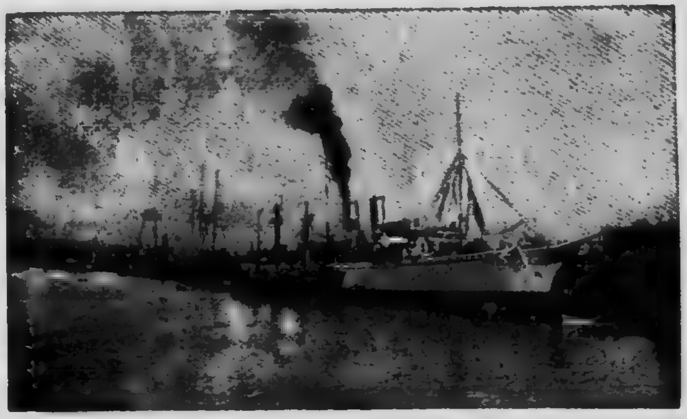

FIG. 61.

A view among the ships in the harbor of Vancouver, B.C. The large white steamship is unloading tea from China and Japan.

Since the ocean easily connects such harbors with all parts of the world, it is natural that large cities should spring up where the best ocean harbors are found. It is partly on this account that Montreal, Halifax, and St. John have become such large cities; and that Victoria and Vancouver are growing so rapidly.

Vessels come toward these *seaports* from all parts of the world; but it is often difficult to tell just where to enter the harbor, especially at night. Ships are in danger of going out of the right way, and of running upon rocks, or *reefs*, in the shallow water near the coast (Fig. 62). On this account, tall lighthouses are built on many islands and capes, so that captains may know by the lights which way to go in order to enter the harbors (Fig. 63).

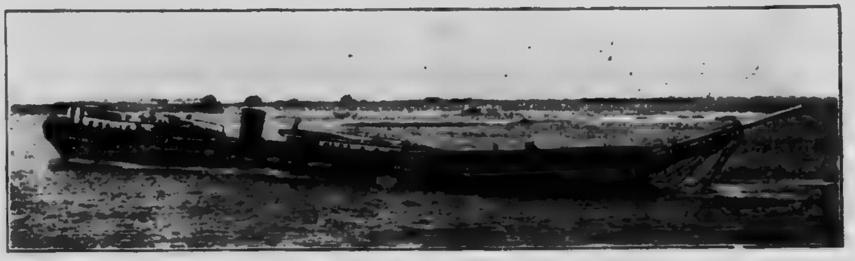

FIG. 62.

A vessel wrecked by running aground upon a shallow reef.

The ocean is a great waterway, connecting different parts of the world.

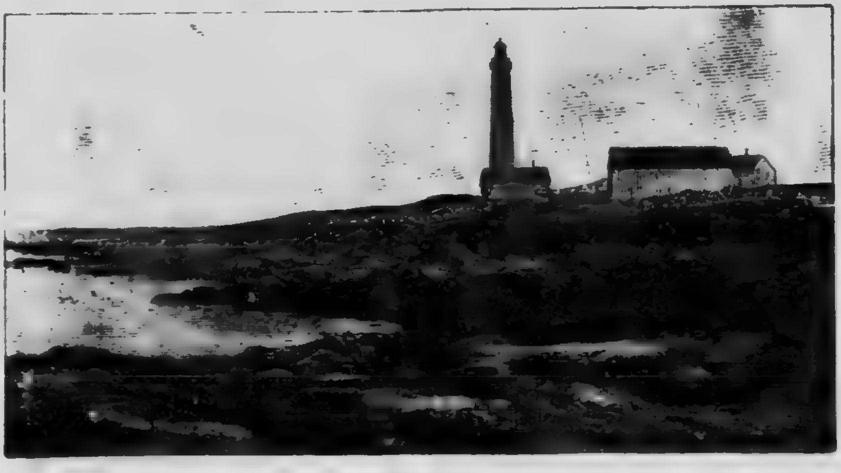

FIG. 63.

A lighthouse on a rocky point. A bright light is placed at the top of the tower so that it may be seen far away.

Not only are goods carried on vessels, but many men go out in them, often beyond sight of land, for the purpose of catching the fish which live in such great numbers in the sea. Instead of hooks and lines, long nets are often used, and in them so many fish are caught that the vessel is loaded down with them. No doubt some of the mackerel or herring that you have eaten have been caught in this way. Figure 67, p. 70, shows a vessel that is used to catch ocean fish.

In summer the ocean shore is cooler than the land far away from the sea. This is because the air is cooled as it passes over the water. Many people therefore go to the seashore to avoid the hot weather, just as others go to the mountains. Here they spend day after day climbing about over the rocks or walking upon the clean, sandy beach, breathing the fresh air, enjoying the beautiful scenery, and bathing in the cool salt water (Fig. 64).

FIG. 64.

A seaside summer resort. Notice the large number of summer visitors strolling over the cool, hard beach, or bathing in the shallow water.

On this account many houses, and even towns, have been built at those places along the seashore where people wish to spend their vacations. There are large hotels to accommodate the visitors; and in the summer these places are crowded; but very few people remain at the *summer resorts* during the winter.

There is another way in which the ocean is even more useful to man. It is the sea-water which supplies us with moisture, so that there can be rain. If it were not for the great ocean, very little rain would fall. Thus every one is deeply indebted to the ocean, even though he may live thousands of miles from it. You will learn soon (p. 71) how its water reaches us in the form of rain.

The seashore is a popular summer resort; the ocean water supplies food and makes rain possible.

Rivers, lakes, and the ocean present many beautiful views. You may have observed that in cities, where people plan fine parks, they arrange, if possible, to have a lake or stream as part of the scenery. A body of water, even if but a brook, greatly improves a view.

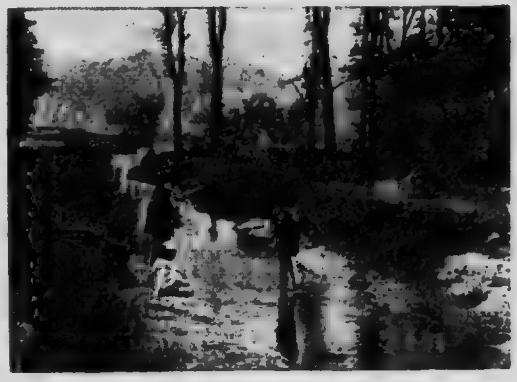

FIG. 65.

A pretty brook in Rosedale Park, Toronto.

A brook is a beautiful object (Fig. 65). How pleasant to see its green banks, to listen to its rippling waters, and to watch its tiny rapids, whirlpools, and falls, as it travels onward to the ocean!

Rivers are not less attractive; like the brooks, their rushing waters seem to tell a story, and one loves to linger by them, to listen and to look. At times, when swollen by floods, they are wild and boisterous; again they are quiet, peaceful, and beautiful. They wind in and out among the steep and wooded hills; now they flow along noiselessly, then they rush over rapids and falls with a roar; here their banks are low and green, there they are high, steep, and rocky.

The lakes and the ocean are sparkling sheets of silvery water, often dotted with white sails. Sometimes the color is green, at other times it is blue; and when the heavy clouds hang over it, it is dark and gloomy. There are beautiful sunrises and sunsets to watch; and one can see the storms come and go, with the waves dashing into the whitest of foam. In fact, the water, the sky, and the coast are always changing in appearance, so that the lake shore and the seashore are among the most attractive of places.

The land and the water together furnish many beautiful views.

VIII. THE AIR

Since air cannot be seen, people often forget that it really is something; but a fire will not burn without it, and plants, animals, and men must have it to breathe. In fact, drowning means nothing more than being smothered under water, where there is not enough air to breathe.

This is proof that the air is really something, even though it cannot be seen; and you can prove the same thing in other ways. For instance, if you stand with your face to a breeze, you feel the air moving. Sometimes this movement of the air, which we call *wind*, is so rapid that it blows down trees and houses.

Here is an experiment to prove that the air is something and that it fills space.

Find an empty bottle without a cork and sink it in water with the open end up. Notice the gurgling noise as the bubbles of air rise to the surface while the bottle slowly fills. Where does this air come from? And why does not the bottle fill more quickly? You see that although we called the bottle *empty*, it was really filled with air which could not be seen. The water could not enter the bottle until it pushed the air out, because the bottle could not be filled with two substances at the same time. So, as the air was leaving, the water was entering.

If the bottle is turned bottom upward, and pushed perfectly straight into water, the air will be given no chance to slip out, and then the bottle cannot be filled with water.

Air is something real and occupies space.

There is air all around the earth, and it extends many miles above us. This air, often called the *atmosphere*, is usually in motion, now in one direction, now in another, and it often moves fast enough to cause a breeze, or wind.

Even when the wind is not blowing near the ground, it may be doing so far above, where the clouds are. You can see that this is so, if you watch the clouds as they are driven along by the winds.

Let us see what causes the air to move. Heat has much to do with it. If you watch smoke in a room where there is a lighted lamp, you will see that it moves toward the lamp, and then rises above it (Fig. 66). Hot air also rises above a stove, or above a furnace through the registers; and during the winter, when there is a hot fire, the air near the ceiling of a room is much warmer than that near the floor.

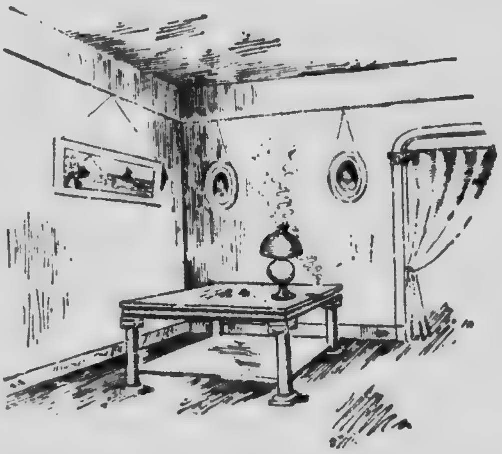

FIG. 66.

The smoke of a cigar rising from the table above the lighted lamp.

The reason for all this is, that when air is warmed, it is expanded and made lighter. Light objects, such as wood, will rise and float in water. So, also, when air is heated near a lamp, the warm air rises because it is lighter than the surrounding cold air, which, pressing in toward the lamp, pushes the warm air upward and thus produces what is called *circulation*.

Now we understand the cause of winds. The atmosphere in one place, perhaps to the north of you, is colder than that where you are. This colder air, being denser and heavier than the warm air, begins to push it away and thus moves toward you, forming a cold north wind.

People on the sea or lake shore often have such winds in summer, when, during a hot day, the air over the land becomes heated, while that over the water remains cool. The cool air then commences to move landward, and a cool sea breeze begins to blow.

Whenever the air is heavy in one place, and light in another, winds will blow toward the place where it is light. Since this lightness of the air is *usually* caused by heat, we say that

Most winds are caused by differences in the temperature of the air.

Winds are useful in many ways. They drive sailing vessels through the water, and they turn windmills (Fig. 68), which are often used to pump water from wells. But what is most important, they carry water over all the earth. At all times there is enough water in the atmosphere to fill many large lakes.

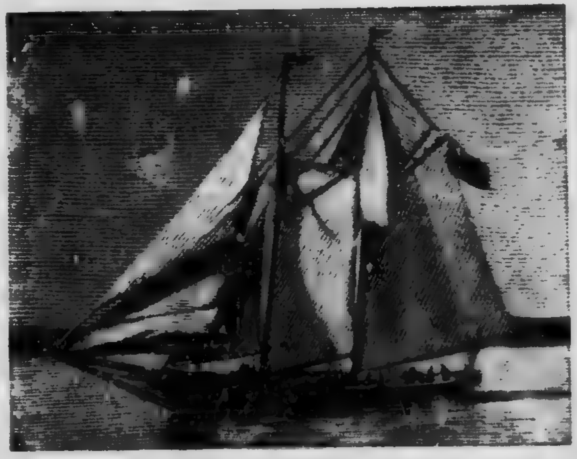

FIG. 67.

A sailing vessel driven through the water by the wind. This is a fishing schooner going out of the harbor of Lunenburg, Nova Scotia, for a load of fish.

You know that there must be some water in the air, for wet clothes hung out on a line become dry as the water passes off into the air.

Fig. 68.
A windmill.

Some of the water in the atmosphere enters it after every rainstorm, when the muddy roads and wet fields are drying; but most of it comes from rivers, lakes, and the ocean. You have already learned (p. 60) that the ocean covers about three-fourths of the surface of the earth. The air is taking water from all parts of it, so that each minute enough water to fill thousands and thousands of barrels is leaving the ocean and floating away in the atmosphere.

Another reason why we know that there must be a quantity of water in the air, is that much comes out of it in the form of rain, snow, hail, dew, and frost.

The air takes up water from one place and holds it, perhaps for many days, during which time the winds may have carried it hundreds of miles; by and by this moisture will fall. Thus it is by the help of the wind that rocks are wet and caused to change to soil, plants are made to grow, rivers are furnished with water, and animals and people are provided with water to drink.

Persons living where there is plenty of rain perhaps do not realize how important it is; but there are some parts of the earth where the air is so dry that very little rain can fall from it. In these places, called *deserts* (Fig. 69), only a few kinds of plants and animals can live, and but few people inhabit them.

The air takes water from the ocean, and the winds carry it about.

What causes water to rise into the air? And why can we not see it there? If you observe a boiling kettle, you will see that "steam" rises from it. In a short time all the water will be boiled away, passing into the air, where you can no longer see it.

The water in the kettle was a *liquid*, which could be seen; but heat has changed it to a *gas*, which, like air, is colorless and cannot be seen. Then, too, it is so light that it floats in the air. This water gas is called ***water vapor***, and the change from water to vapor is called ***evaporation***.

FIG. 69.

Camels crossing the desert. Notice how barren it is.

It is not necessary to boil water to make it evaporate; for all over the earth, where there is water, vapor is rising from it into the air. You can prove this for yourself by placing a pan of water on a table and leaving it for some days, and then noticing how much of it has evaporated. You may also plainly see the steam rising from the sidewalk, and passing off into vapor, when the sun shines out after a summer shower. It is in this way that the great amount of water, which every moment is rising from th ocean, is able to pass into the atmosphere.

Water vapor is obtained by evaporation.

When it falls from the sky as rain, the water vapor has changed back to water. What causes it to do this?

Have you ever noticed a glass or pitcher of ice water "sweat" on a hot summer day (Fig. 70)? The water that collects on the glass has not leaked through, for there are no holes in the glass. What has really happened is that the air near the dish has been cooled, so that the vapor has collected in drops on the cold surface of the glass. Drops would gather there just the same, even if no water were in the glass, provided the surface remained just as cold.

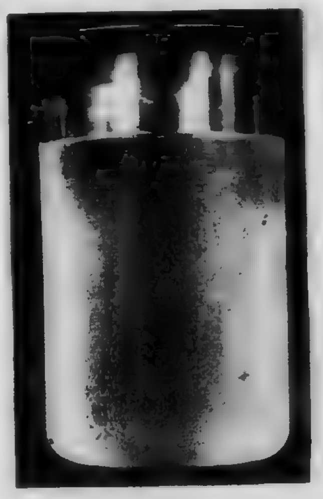

FIG. 70.

Little drops of water condensed from the vapor of the air on the outside of a glass of cold water.

On washing day, when a great deal of water vapor rises from the boiler, the windows are often covered with drops of water, because the vapor has been changed back to liquid, or *condensed*, on the cold window pane. Your own breath contains vapor, and you can change it to water by breathing on a cold window pane. So you see that if air loaded with vapor is cooled, some of the vapor is changed back to water.

There are several ways in which air may be cooled. You know that mountains are *colder* than the lower lands (p. 19): so that winds blowing over them are often chilled, and their vapor condensed. It is evident from this that mountains are an important help in causing rain.

Vapor may also be condensed when a cold wind blows against a warm one. Again, during summer the sun may shine down so hot that the air near the earth becomes warm. This makes it so light that it often rises high into the sky, where the air is so cold that the vapor condenses into rain. The summer thunder showers, which often come on hot afternoons, are caused in this way.

Vapor is condensed by the cooling of the air.

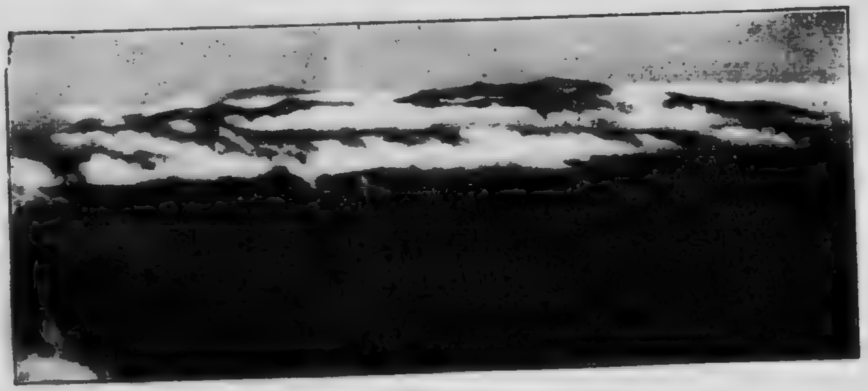

FIG. 71.

Clouds formed upon the mountain sides because the air has been chilled.

There are several different forms of condensed vapor. When you breathe into the air on a cold, frosty morning, your breath forms a little *fog* or cloud. The cold air has made the vapor change to tiny particles of water, so small that you cannot see a single one, though many of them together make a thin mist. You have no doubt seen fogs in valleys, on lakes, or over the ocean. These are always made of tiny drops of water condensed from vapor in the air.

Most *clouds* are also made of tiny fog and mist particles. These, too, are caused by the cooling of the air, sometimes when it moves against mountain slopes (Fig. 71), sometimes when cold winds blow against warm ones, and sometimes when warm air rises high in the heavens and becomes cool (Fig. 72).

FIG. 72.

A summer cloud, often called a "thunder head," formed by the rising of warm air to such a height that the vapor is condensed.

Another form of condensed vapor is the *raindrop* which falls from the clouds. These drops begin as tiny mist or fog particles, and then, becoming larger and larger, grow so heavy that they can no longer float, and must therefore fall.

We have seen that water may be either a liquid or a gas. There is still another form, the *solid*, which is produced when vapor condenses in a temperature below 32°, or the freezing point. Then *snow* or hail is formed instead of rain (Fig. 73).

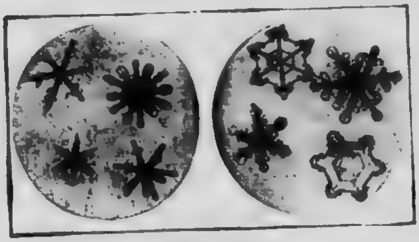

FIG. 73.

Photographs of snowflakes. Some time, when light, feathery snow is falling, notice what beautiful forms it takes.

At night, drops of water often collect on the cold ground, on grass and leaves, somewhat as it does on an ice pitcher or the window pane. This is *dew*, which gathers because the ground cools quickly after the sun sets, so that the warm, vapor-laden air is chilled until the vapor is condensed. If the temperature is below the freezing point, *hoar-frost* is formed instead.

You will notice that raindrops, fog particles, and snowflakes form in the air, while dew gathers on grass and the drops of water on window panes. Really the raindrops and fog particles also gather on solid substances; for there are many tiny, solid particles of dust floating in the air, which you can often see dancing in a beam of sunlight, and it is around these that the rain, fog, and snow form.

It is condensed vapor that forms fog, mist, rain, snow, hail, dew, and hoar-frost.

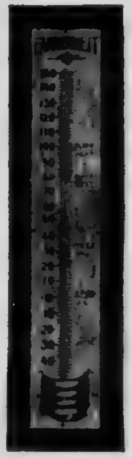

FIG. 74.
A picture of a thermometer, showing the glass tube in which the mercury rises or falls, according to the temperature.

Usually, winds from certain directions, as from the ocean, are liable to bring rain, while others indicate fair weather. By keeping a daily record of the direction of the wind, and of the kind of weather it brings, you will be able to find out for yourself which of your winds cause fair, and which rainy weather. You might also look at the thermometer (Fig. 74) at the same time, and note the temperature. By these means you can learn something about the weather around your home. A record of this kind, which would be called a *weather record*, might be kept somewhat as follows: [1]

DATE AND TIME OF DAY.	DIRECTION OF WIND.	KIND OF WEATHER.	TEMP.
Aug. 17, 1901, 8 A.M.	Southeast.	Cloudy.	70°
Aug. 17, 1901, 8 P.M.	Calm.	Gentle Rain.	72°
Aug. 18, 1901, 8 A.M.	West.	Clear.	68°

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[1] If it is practicable, the teacher should at this point introduce an elementary study of weather maps and have the pupils read them each day.

IX. NATURAL PRODUCTS OF THE LAND AND WATER

In whatever part of the country we live, we find that we are indebted to the land or the water for some valuable natural products, and that it requires more or less labor to get these or to make them suitable to our wants.

We call those things ***natural products***, which have their origin in the land or water, and which cannot be made by man, although some of them may be improved by cultivation.

These natural products may be classed as: those of the *farm*, such as grain and cattle; those of the *forest*, as timber or lumber; those of the *mine* and *quarry*, as gold, iron, coal, or petroleum and building stone; and those of the *sea*, as fish, the seal, and the whale.

All our wants, as far as regards the necessaries of life, — food, clothing, and the comfort of the body, — are supplied by these products, whether they be in their natural state, or improved by cultivation; and, while our own country furnishes the most of what we require, there are also many things that we use every day which are the natural products of other countries, and which we cannot produce in our country, such as tea, coffee, rice, and sugar.

When our own district produces more of any article than is required for our own wants, we sell what we have over, either by bringing the articles to market (Fig. 74*a*), or by sending them away by steamer or by railway to other places where they are required; and we get in exchange articles produced elsewhere. This is called ***trade*** or *commerce*, and of this we shall learn more as we go on (p. 101).

In a country so large as the Dominion of Canada, we find that the natural products of one part vary greatly from those of other parts, according to the locality. Those of the sea-coast vary from those of the interior, and those of mountainous regions from those of the plain, or more level land.

FIG. 74 *a*.
Market-day. A typical market-place, Brantford, Ont.

The natural products of any locality depend greatly on the ***climate***, whether it is warm or dry, or bleak and damp and cold; on the ***surface of the land***, whether it is mountainous (p. 25), and where the water flows rapidly away, or whether it is level and well watered; on the *soil* (p. 8), whether it is fertile, or rocky and barren; on the *drainage* (p. 33), whether it is swampy, or whether the surplus water and the melting snows from the winter flow easily away.

FIG. 75.

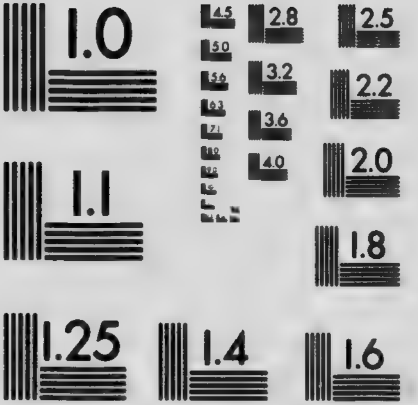
Lincoln sheep, from a farm near London, Ont. Noted for their long, soft wool.

Most localities have their special products, for which they are best adapted.

FIG. 76.

Canadian Pacific Railway elevators at Fort William for storing grain to be shipped away.

In a farming district, on the rolling lands of the east, or on the level prairies of the northwest, we see the waving fields of grain, or flocks of cattle and sheep (Fig. 75), and we see the farmers driving to town with loads of hay, wheat, oats, potatoes, and other



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NATIONAL BUREAU OF STANDARDS
STANDARD REFERENCE MATERIAL 1010a
(ANSI and ISO TEST CHART No. 2)

farm produce. We may also see great elevators and storehouses (Fig. 76) built to receive the grain, and railway cars loaded with grain, cattle, sheep, and hogs, or with butter, cheese, and eggs.

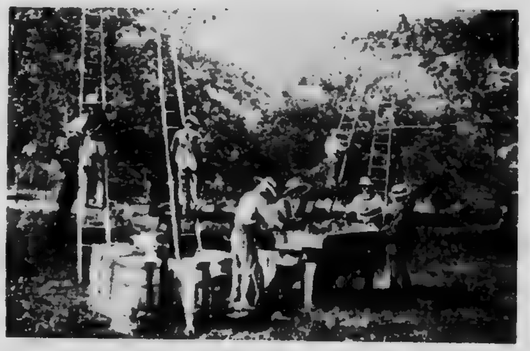

FIG. 77.
Picking apples in the Niagara district in Ontario for shipment to Great Britain.

In a grazing country, as on the great prairies of the northwest, we find cattle and sheep (Fig. 83), which are raised not only for the beef and mutton they supply, but also for their hides or skins, which are made into leather, and for the wool from which our warm clothing is made.

In a fruit-growing district (Fig. 77) we see great

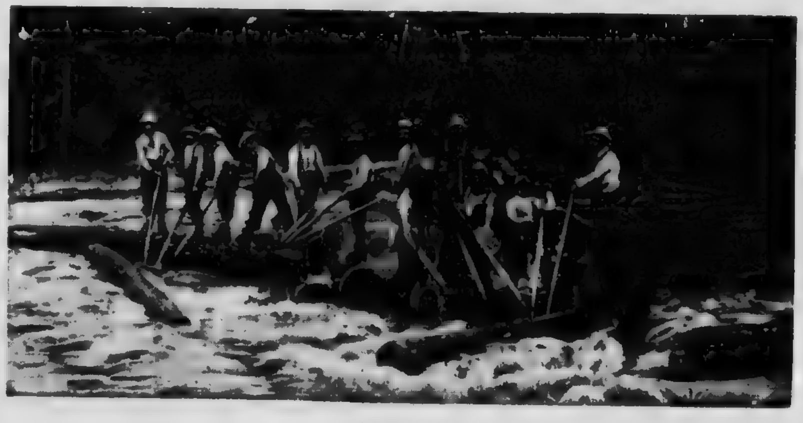

FIG. 78.
Breaking a jam of logs on the Nashwaak River, New Brunswick.

attention paid to the cultivation of grapes, peaches, apples, berries, and other fruits. Gathering, packing, and sending the fruit to market also gives employment to many persons.

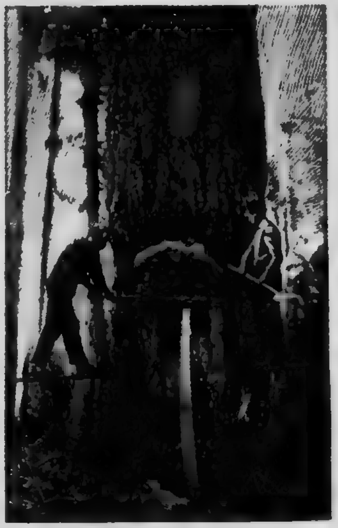

Fig. 79.

Felling big trees near Vancouver, B.C. Note the platform, on which the men stand, so as to be above where the roots begin to spread.

In a lumbering country we see logs cut from the forests and floated down the rivers and lakes in such immense quantities that they often jam together and block the passage of the rivers (Fig. 78). These logs at length reach the sawmills to be cut into lumber. We see huge trees chopped down with great labor (Fig. 79) and floated down the rivers and lakes to a seaport, there to be loaded on ships and sent abroad, or made into masts for ships, or cut into square timber for buildings; besides trees cut down for telegraph poles and many other purposes.

Fig. 80.

Trip of mine cars, drawn by an electric motor, Crow's Nest Colliery, British Columbia.

In the mining districts we see coal, or iron and other ores dug out of the mines and brought to the surface of the ground (Figs. 23

and 80); or we find many men patiently digging out the soil and washing it carefully to secure the gold it contains.

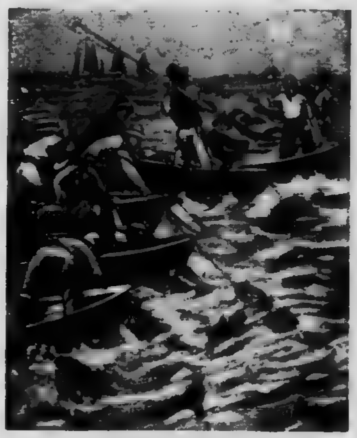

FIG. 81.

Cod-fishing on the Banks of Newfoundland.

On the sea-coast, out on the ocean (Fig. 81), on the great lakes, and on the rivers flowing into the sea, we find the fishermen gathering and bringing in great loads of fish in their boats, and we find also large storehouses for receiving the fish (Fig. 82), and factories for canning or preparing them for market.

These are the main natural products of our country, and it is upon these that we are all more or less dependent for our living.

The natural products of a country form the foundation of the wealth and prosperity of the people, because they afford employment to so many persons, not only directly in cultivating or procuring them, but also in their transportation and in the various industries connected with them. They not only supply our own wants, but help to supply the

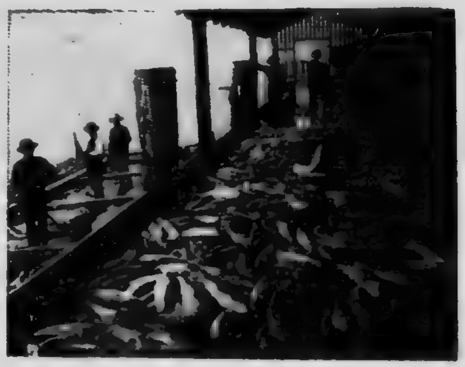

FIG. 82.

Unloading salmon on the Fraser River, British Columbia.

wants of people in other countries, who in return send us their products, which are very different from ours, and which we cannot produce in our own country.

What articles are produced in your locality in greater abundance than they can be used at home? Where is the surplus sent to?

The timber of our forests, besides giving employment to the lumbermen, supplies our sawmills, gives employment to carpenters in building houses, to the cabinet-maker in making furniture, to the waggon-maker, railway car-builder, ship-builder, agricultural implement maker, and many others. Can you name any other trades which require to use wood? How many industries can you name which use iron, from the making of a tack or nail up to the great iron buildings and bridges, the rail of the railway, or the huge locomotive that draws the train? How many industries are dependent on our cattle and sheep? On our fisheries? On our mines? To how many uses are our coal and iron put? What industries connected with our natural products are there in your neighborhood?

X. OUR DOMESTIC ANIMALS

EVERY one is familiar with the horse, the ox, the cow, the sheep, the pig, the goat, the dog and cat, the poultry; and it ought not to be difficult to state the use each of these is to us.

These were all originally wild animals, and even now are to be found in their wild state in various parts of the world. They have, however, been tamed by man, and gradually brought to their present state of perfection and usefulness by careful attention to their training and breeding; and thus we call them our *domesticated animals.*

A very natural question is, "Do the people in other countries have the same kind of domestic animals that we have?" The answer to this question forms part of the knowledge that we gain by the study of geography. We shall see that while these animals are found in every part of our country, some are more successfully raised in one part than in another, chiefly because the climate and the products of the soil are better adapted for that purpose. Many of them, too, are to be found in other parts of the world much more abundantly even than in this country.

While cattle, sheep, and horses are raised by most farmers, yet the great cattle *ranches*, or pasture grounds, are on the level grassy plains in the northwest (Fig. 83). Similar ranches are found in the United States, in South America, and in Australia.

Sheep are raised in this country, but far more abundantly in Australia and South Africa.

We use the horse for riding and driving, for work on the farm or for teaming in the cities; and oxen for dragging loads over rough roads, as in lumbering, or in ploughing over rough fields.

FIG. 83.
View of a cattle ranch in Alberta, N.W.T.

In other countries we find the ox very generally used by farmers, in Mexico (Fig 84), India, Africa, and elsewhere; while the horse is used chiefly for riding.

For carrying loads over rough roads or through mountainous districts, instead of the horse we find the mule or the burro (ass) used in Central and South America (Fig. 84); and the llama and the alpaca, often called the American camel, in South America. Across the sandy deserts of Asia and Africa camels carry the loads (Figs. 69 and 84), because they can travel for days together with little or no water, whereas other animals would die of thirst.

Dog teams draw the loads on sleds over the snow in the northwest (Fig. 84). They and the reindeer (in Europe) are the only beasts of burden in the far north.

In Asia, the elephant becomes the great helper of man, carrying passengers on his back in what is called a how-

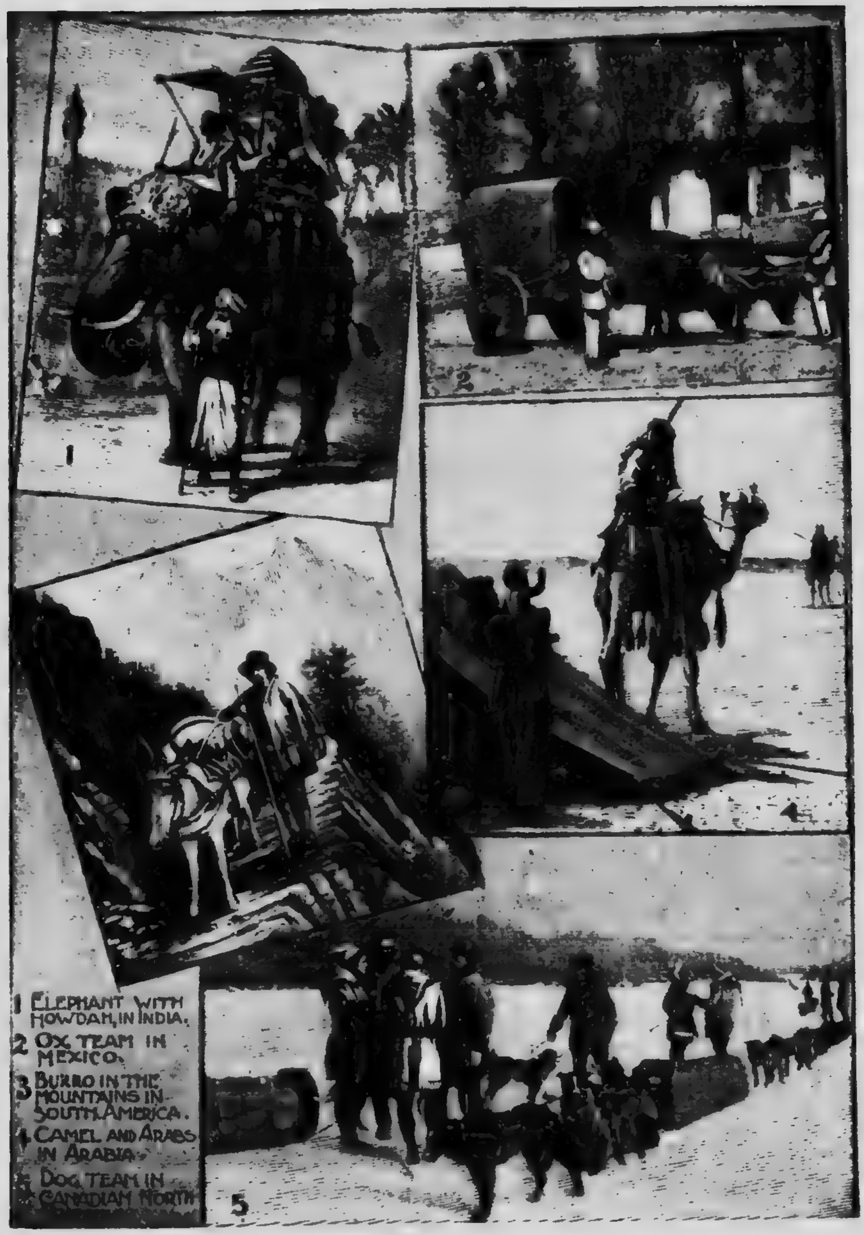
1
2
4
5
1 ELEPHANT WITH HOWDAH, IN INDIA.
2 OX TEAM IN MEXICO.
3 BURRO IN THE MOUNTAINS IN SOUTH AMERICA.
4 CAMEL AND ARABS IN ARABIA.
5 DOG TEAM IN CANADIAN NORTH

FIG. 84.

dah (Fig. 84). He is also used for lifting and hauling heavy loads, and for hunting through the thick, tangled jungles of the southern part of that continent.

So we see that each country or part of the world uses those animals which are best suited to the country, and can therefore do the work that is required there in the best

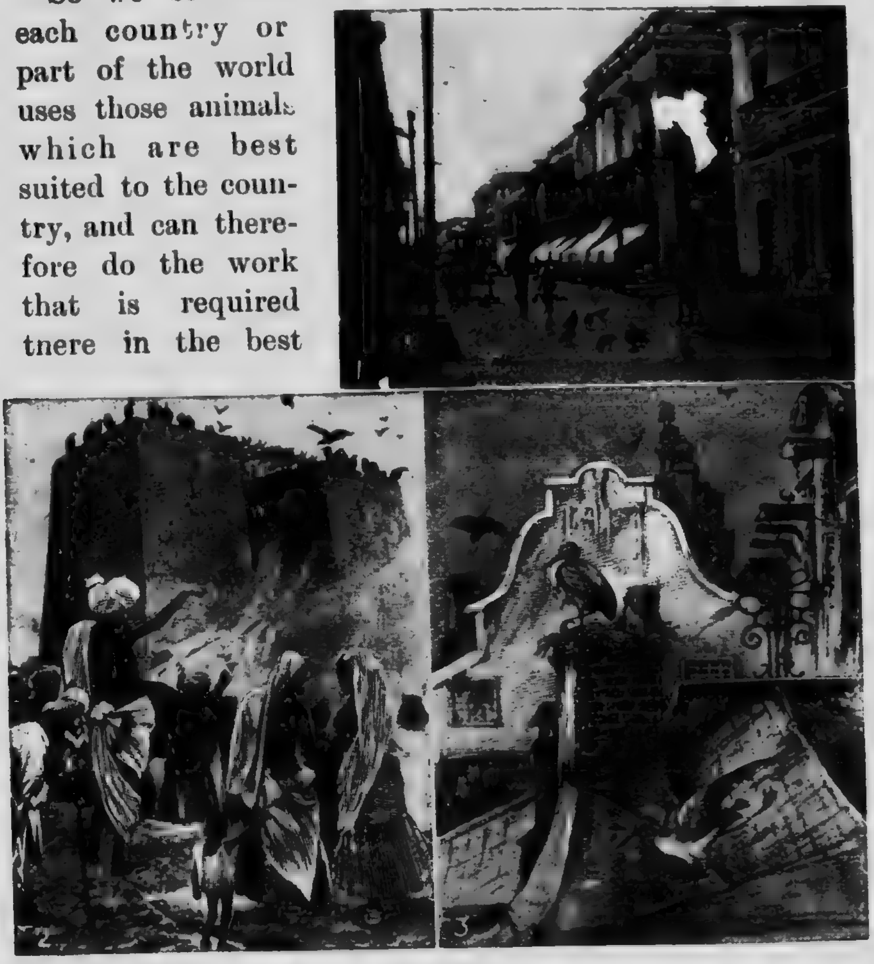

FIG. 85.

1. Buzzards in a street of Vera Cruz, in Mexico. 2. A Parsee funeral procession to the Tower of Silence, at Bombay, in India. The vultures live on the bodies of the dead, which are exposed there, instead of being buried. 3. Storks on the housetops of Amsterdam, in Holland.

manner. The horse on the plains, the ox on the rough ground, the mule or ass in the mountains, the camel in the desert, and the elephant in the jungle.

Besides these domestic animals there is a great variety of wild beasts, of which we shall learn later on. Some of these, half-tamed, are protected by law, and have become the scavengers of old cities, which are not kept as clean as those in our country ; such are the stork, the hyena, the jackal, the vulture, and the buzzard (Fig. 86).

XI. PEOPLE

Do you ever think, when you see a colored man, that there are lands where all the people are *black?* And yet there are parts of the world through which you might travel a long distance, where no white man has ever been seen.

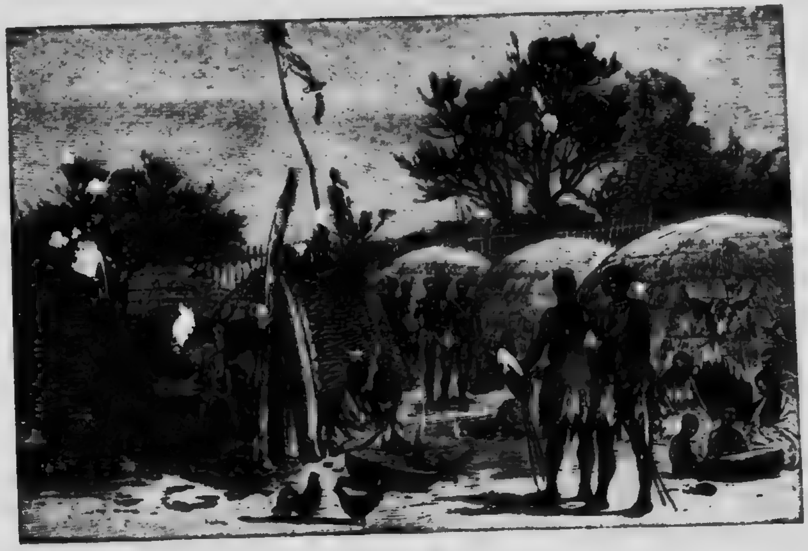

FIG. 86.

Interior of a kraal, or Zulu village, on the Tugela River, in Africa.

All the people are negroes (or *blacks*), and that part of the world which is their native land is the great continent called Africa.

In what is really the home of the black people, it is very hot all the year round. The land requires very little labor to cultivate it, and many fruits and roots grow wild. Therefore, the people require few clothes, and do not have to exert themselves to till the ground or to build very substantial houses.

In their own country, the negroes, instead of living under a government such as we have, were, and indeed are now, gathered together in small tribes, living in huts made of plaited grass or rushes (Fig. 86), and sometimes surrounded by a fence of posts (or *stockade*, as it is called) stuck into the ground close together. These tribes often quarrelled and fought with each other, and, when they made prisoners, sold them as slaves to a fierce race of men called Arabs, who treated them most cruelly, and drove them naked, in gangs (Fig. 87), to a seaport, from which they were sent away in horrible slaveships to other

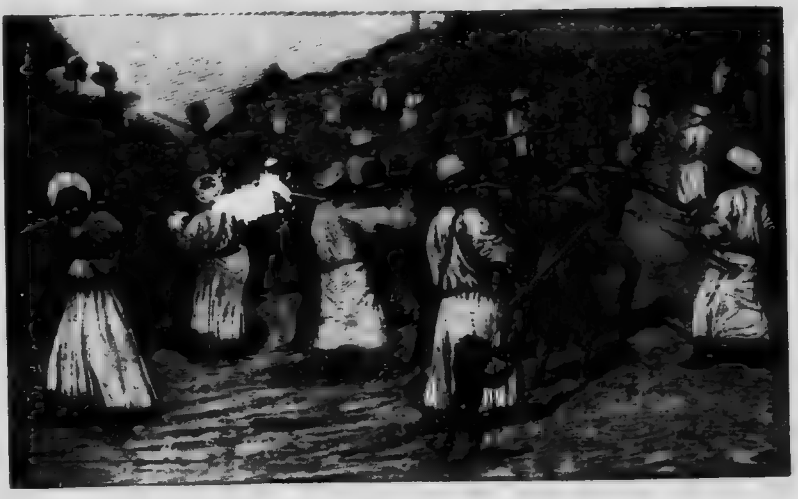

FIG. 87.

A slave raid in Central Africa. Notice the heavy wooden yokes on the men's necks, and the poor little children running after their mothers.

countries to labor, and to be bought and sold like cattle. Many negroes in this country escaped originally years ago from our neighboring country, the United States, when negro slavery was allowed there, or are descendants of those escaped slaves, who, as soon as they reached Canada, became free. It was not until a great war took place in the United States, about forty years ago, that the negroes there became free and were allowed to work for themselves.

Most boys and girls, or at least those who live in a city, have seen the Chinaman who keeps a laundry. You will generally see him with his hair plaited into a queue at the back of his head, wearing a blouse and strange-looking thick-soled shoes. You can easily see that he is not a

FIG. 88.

Chinese children eating rice with chopsticks. These chopsticks are like wooden knitting-needles.

native of this country. He does not speak our language. The color of his skin is different from ours. He has no family, no wife, no children. Why is this? And where does he come from? You will want to learn all about him, and where he has left his family; about the land where there are little Chinese children (Fig. 88) with their mothers. You will want to learn what the Chinamen do in their own country, what they grow in their fields, and what sort of houses they live in; their big cities and their temples and palaces; their queer-looking ships, and many other strange things.

You will find that theirs is a great country, with more people in it than in any other country in the world. From their country comes much of our tea and silk.

The Chinese are generally called the *yellow* race.

Another race of people is familiar to most of us in this country. This is the Indian, or *red* man.

Our continent was the original home of the red man, or Indian, and long before the white man discovered America, the whole of this great continent was inhabited, although very thinly, by the people of this race.

They are called Indians, because the first discoverers of America, when they reached the shore of this continent, thought that they had travelled so far round the world that they had come to a part of India, a

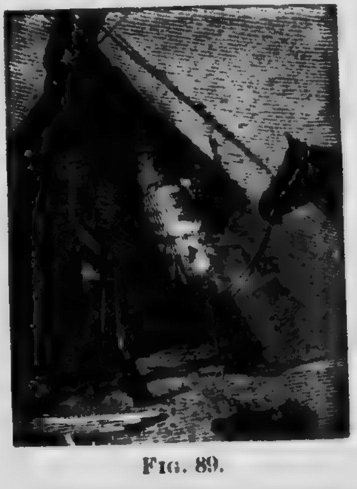

FIG. 89.

A Blackfoot Indian, and tepee, in the northwest, near the Rocky Mountains.

great country on the continent of Asia. They did not know that they had many thousands of miles to travel before they could reach that land. The name has, however, been retained, as meaning the original inhabitants of America.

Fig. 90.
Patagonian in the far south of South America, more than 6000 miles south of Canada.

Fig. 91.
Apache Indian in Mexico, near the centre of the great continent of America.

The whole of our own country belonged originally to the Indians, and some of the fiercest and most savage tribes of them all inhabited Canada and the country adjoining, now the United States. These people were often unjustly treated by the white men, and with their natural ferocity inflamed by a desire for revenge, they carried on a frightful and barbarous war against the invaders of their country, cruelly murdering and torturing every one they could lay hold of. The story of the sufferings and privations of the early pioneers and discoverers, who travelled over a great part of the country, forms a most interesting account of daring exploits, patient endurance, and thrilling adventures. These early travels were made chiefly in birch-bark canoes on the lakes and rivers, or on foot through the wild woods and across the broad prairies; and the travellers suffered many hardships and perils in their passage through the unknown country, in addition to the dangers from the hostile Indians.

The Indians were continually at war with each other, like all the nations of olden times, and, like the blacks of Africa, were divided into many tribes. The wars became more fierce and bitter when the whites came among them, so that the tribes became much reduced in numbers, until now only a few Indian villages and settlements are to be found scattered over this country, and it is only in the mountains of the far west and north that the Indian is to be found in his ancient uncivilized state.

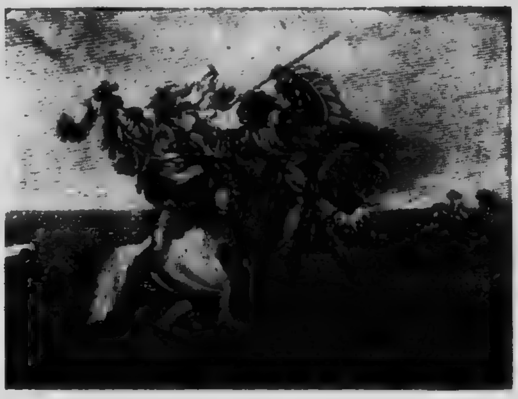

Fig. 92.

Fight between a Cree and a Blackfoot Indian in the northwest, not eighty years ago.

From a painting by Paul Kane. By permission of the Hon. Geo W. Allan.

Until a few years ago the Indians in the far west carried on their wars with one another (Fig. 92), but now, except in some parts where they still hunt the deer and wild animals for the furs, they have settled down into villages and on lands called

Fig. 93.

Group of Algoma Indians, pupils at the Shingwauk Home, Sault Ste. Marie.

Fig. 94.

1. Group of Italian peasants. 2. Norwegian fish market. 3. Greek in typical costume. 4. French peasant child — note the little wooden shoes. 5. Russian peasant girls. 6. Swiss mountaineer.

"reservations." These are specially reserved for the Indians, and there they cultivate a little land and live a lazy, peaceful life, assisted by a pension from the Government. There, also, are to be found schools, established by the Government, for the Indian children, where they are taught useful occupations as well as the simple school lessons.

In Figure 93 we see a group of these young Indian students, who for intelligence and brightness of expression would do credit to any of our schools. And we must never forget our duty by them, inasmuch as by our having taken possession of the lands of their forefathers, they have become the wards of our country, and our country must, therefore, be their guardian.

We have now seen that besides our own race, the white people, there are black, yellow, and red people. These are called the four great divisions of the people of the world.

You will learn farther on how all the white people also are divided into nations or tribes. You have seen Frenchmen or Germans or natives of other countries, who speak other languages than English, and as you proceed with your lessons you will find how the white race is divided into many different peoples (Fig. 94), speaking many different languages, not one of which can understand the language of the other, and yet all belonging to the "white" race.

In the illustration (Fig. 94) we see some of the people belonging to the white race in Europe, but there are also many other branches of the same race in Asia and Africa as well.

It is the same with the other races. They are divided into many nations or tribes, speaking languages altogether different from those of the white people.

As it is with the languages, so it is with the dress, the food, the manners and customs, the occupations and the modes of living. Each country has its own peculiarities which vary from those of the others, and if you were to travel round the world you would find much to see and wonder at, and you would realize how much there is to be learnt and studied in this great world.

XII. INDUSTRY AND COMMERCE

Every man is expected to engage in some kind of work or *industry* in order to earn a living. As we have already learnt, many are engaged in securing or cultivating the natural products of the land or of the water, according to the locality in which they live. Others again, instead of working to cultivate or gather these natural products, are engaged in manufacturing useful articles such as clothes, cotton goods or woollen cloth, machinery, and materials for building or furnishing houses. Are there any of these in your neighborhood? If so, what do they make? You can at least find a blacksmith's shop, or a tin-shop, or a house that is being built. Notice how many different materials are being used by the workmen. Can you find out how many of these materials are made from the natural products of our own country?

Storekeepers do neither of these two kinds of work; they neither produce nor manufacture. What, then, do they do? Notice how many articles are kept by the grocer, the dry goods merchant, and others whose stores you visit. Where do they get them all?

We know, or can learn, what are the natural products of our own part of the country, and also what articles are manufactured in our neighborhood; but we have to find out where other articles come from and how they reach us; whether they are the products of other parts of our own country, or whether they come from abroad, that is, from

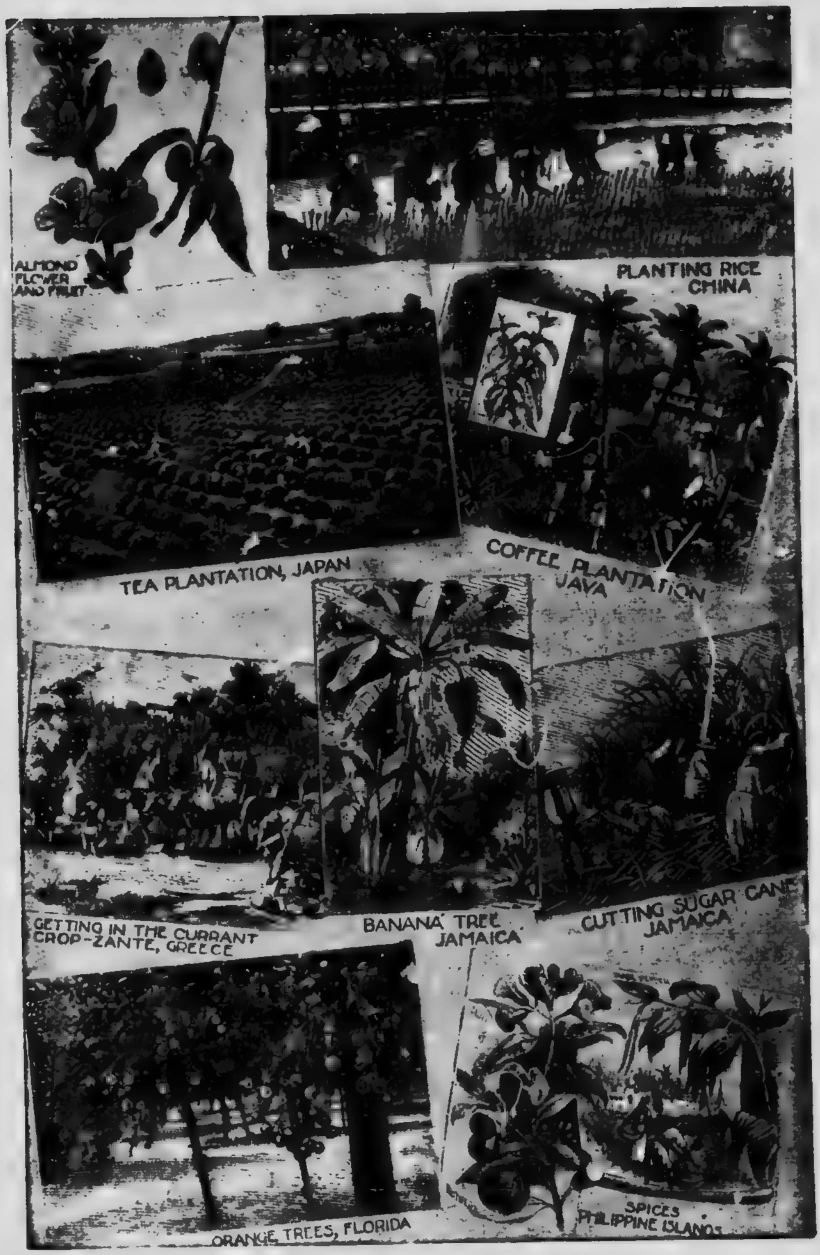
ALMOND FLOWER AND FRUIT
PLANTING RICE CHINA
TEA PLANTATION, JAPAN
COFFEE PLANTATION JAVA
GETTING IN THE CURRANT CROP-ZANTE, GREECE
BANANA TREE JAMAICA
CUTTING SUGAR CANE JAMAICA
ORANGE TREES, FLORIDA
SPICES PHILIPPINE ISLANDS

Fig. 95.

other countries. At the same time that we learn this, we have to find out where the surplus of our products goes, and what we get elsewhere in exchange for them (p. 78). To do this we must know not only about the various parts of our own country but about the other countries of the world as well.

Just as the products of one part of our country vary from those of another part, so the products of different parts of the world vary, and in each case the reason for the difference is to be found, chiefly, in the climate, in the soil, or in the locality, as in our own country (p. 78).

When we come to table we find that although our country produces the most of what we eat — the meat, fish, fowl, vegetables, and fruits — yet, there are the tea, the coffee, and cocoa; the sugar, the pepper, the rice, and spices; the oranges and bananas; the currants and raisins in our cake; the almonds and peanuts — where do they come from (Fig. 95)? And how do they get here?

In the same way with our clothing, our furniture, our houses. While we can produce our own wool, and it can be woven into cloth in our own country; yet we must go elsewhere for our cotton and silk, and we are dependent on other countries for such articles as our tinware, plates, dishes, and cutlery. Even for the brick and stone and lumber in our houses; for the canned fish, fruit, and vegetables we buy at the store; for the manufactured farm implements, furniture, and clothing, we must go to certain localities in our own country.

But, on the other hand, some countries contain so many people that there is not land enough to produce sufficient food for them, and consequently the extra supply necessary must be brought from where it is more plentiful, and where there is more than is wanted for home use. Our own mother country (Great Britain) is an example of this, and the people there would be in danger of starving if it were not for the food supplies sent from Canada and other countries.

One country is dependent on another for many things, and each part of any country is dependent on other parts for many things.

This exchange of commodities or articles, whether manufactured or in their natural state, is called *trade* or *commerce; internal*, if carried on between different parts of the same country; or *foreign*, if carried on with other countries. By this system of commerce, the people of each country are enabled to enjoy the comforts and luxuries of the natural products, or of the manufactures of every part of the world.

The storekeeper is the one who gathers together the various commodities which we require, whether from the producer, the manufacturer, or the importer (the merchant who brings foreign commodities into our country). There are also many persons employed in gathering together our natural products, which are manufactured into articles for our own use, or are exported, that is, sent abroad to other countries to supply their wants.

At the present time it is easy, where most of us live, to buy almost everything, and to find men who can do almost any kind of work. We are so accustomed to all this that we are apt to forget that it has not always been so.

Not much more than a hundred years ago there were no stores in this country and not many houses except in a few seaport towns, or in the neighborhood of some of the old forts which had originally been built for protection against the Indians; only here and there a trading-post had been built of logs, surrounded by a stockade, by the adventurous fur traders.

Each family, as it settled in the country, was obliged to find its own food, make its own clothing, and build its own house. These early settlers, or *pioneers*, as they are sometimes called, did not dare, at first, to venture far from the protecting forts, but when the Indians became more peaceable, they gradually pushed their way into what was literally a wilderness.

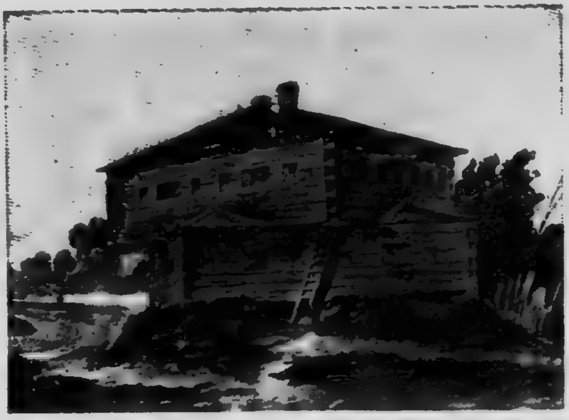

Fig. 96.

An old block-house, built at Toronto, Ont., many years ago, as a fort for the protection of the early settlers.

Let us study more fully how people lived in those days, and how changes have gradually been made until the present manner of living has been reached.

The whole of this country, as well as the whole of the great continent of America, belonged originally to the Indians (p. 92), who were the only inhabitants until adventurous sailors of various nations came from Europe across the Atlantic Ocean, and by force gradually took possession of the land.

The first persons who arrived here naturally settled along the coast and near the seaports, because these were the first places reached.

Fig. 97.

A portrait of Jacques Cartier.

From an original painting by F. Riss, in the Town Hall of St Malo, France

In Canada the first European people to make a settlement were Frenchmen, who sailed from France under the leadership of Jacques Cartier (Fig. 97) not quite four hundred years ago, and took possession of the land in the name of the King of France. The native Indians, although friendly at first, became bitterly opposed to the invasion of their country by the white men. As a protection against the Indians large tracts of land were granted to certain men called seigneurs (*sain-yor*) or lords who built fortified houses upon their property. These became places of refuge for the surrounding settlers, trying to cultivate the land, if at any time they were attacked by the ferocious, hostile tribes of Indians of those days.

The British and other European nations had also made settlements in other parts of America, and for a long time there was bitter warfare between the French and British.

Finally, Great Britain, after many years of fighting, gained possession of Canada, and the wars with the Indians gradually ceased. It then became possible for settlers to take up their homes farther in the country, and for the traders to carry their goods into the far west to exchange for furs.

Only a few years, however, after France had given up

Canada to Great Britain, and only a little more than a hundred years ago, the majority of the British settlers who had made their homes south and east of the Great Lakes, declared their independence of the mother country. They wished no longer to remain a part of the British Empire, but to form themselves into a separate country and govern themselves. There were some among them, however, who remained faithful to Britain, and these were forced to seek refuge in Canada. Here they were welcomed, and were given large tracts of land for settlement. These United Empire Loyalists, as they were called, formed a large proportion of the early settlers of all the eastern part of the present Dominion of Canada, as most of them took up the grants of land that were made to them and began to clear up what was then a wilderness.

FIG. 98.

Old French fort at Chambly, in the Province of Quebec.

In this manner most of the eastern part of the country has been settled either by the United Empire Loyalist families, or by the large number of immigrants who have come from the Old World, as Europe is called, to make their home in the New World.

Often several families settled together, miles away from other people. Sometimes a single family would be alone, and make a home ten or twenty miles from the nearest neighbor.

Of course when a man started out he took some articles with him, as a gun, with powder and bullets, some clothing and some blankets, but upon arriving at his new home he was obliged, like Robinson Crusoe, to rely upon himself.

Many descriptions have been given of the hardships endured by these early settlers. Trees had to be cut down in order to make room for a house, which was built of logs with mud to fill up the spaces between them. It had no floor except the earth, and only one room, with a loft for sleeping in, up to which one had to climb by means of pegs fastened in the logs. The beds were made of posts driven into the ground, with cross pieces between; the chairs were three-legged stools, and the table was a part of a log supported on four legs; coats and trousers were made of deer-skin; a few sheep were raised and flax grown for home-spun clothing; and when the children were not barefooted, they probably used moccasins for shoes.

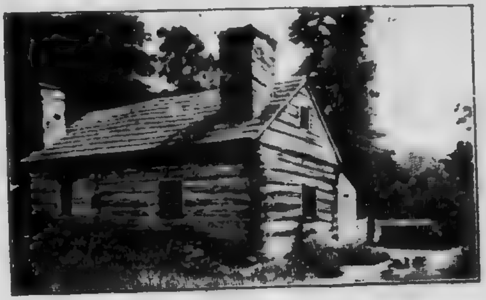
FIG. 90.
A log house, such as the pioneers used to build in the forests.

Usually the early settlers grew their corn and wheat for bread, and when they were unable to get to the mill, which might be a long way off, they would crush the grain as best they could on the *hominy block* (Fig. 100). Their tea was often made from roots and leaves of plants found in the forest, and meat was obtained by shooting wild game.

Almost everything that the family used was grown or made by the father or mother, so that they had to do many kinds of work. If a boy wanted a new suit of clothes, his mother would make the cloth, cut it, and sew it; or if he needed a pair of shoes, his father would be his own tanner and shoemaker.

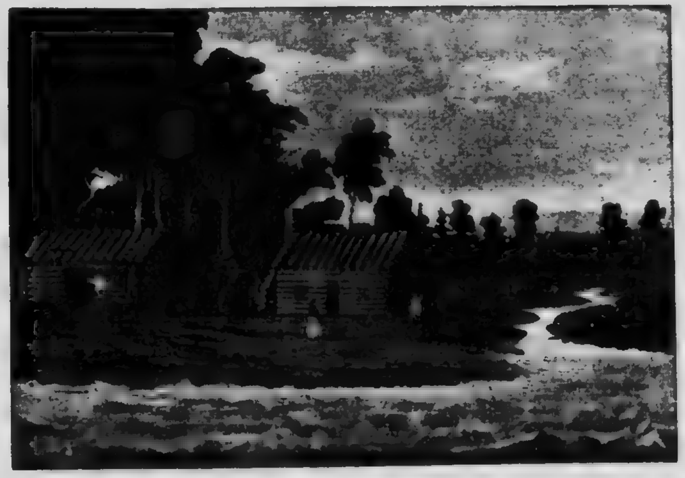

FIG. 100.

An early settler's home. Notice the man in front of the barn on the left, pounding corn on the *hominy block* or hollowed-out top of a stump.

From "Upper Canada Sketches," by permission of Thomas Conant, Esq.

As a rule each man raised more of some things than his own family could use, as for example, wheat, wool, or hogs;

or he made potash from the ashes of trees burnt down in clearing the land; but there were other things that he had to buy, such as tea, powder, and salt.

It was the custom, therefore, to drive or to go by boat if possible, two or three times a year to the nearest town, perhaps a hundred miles away, taking the products of the farm and exchanging them for necessary articles.

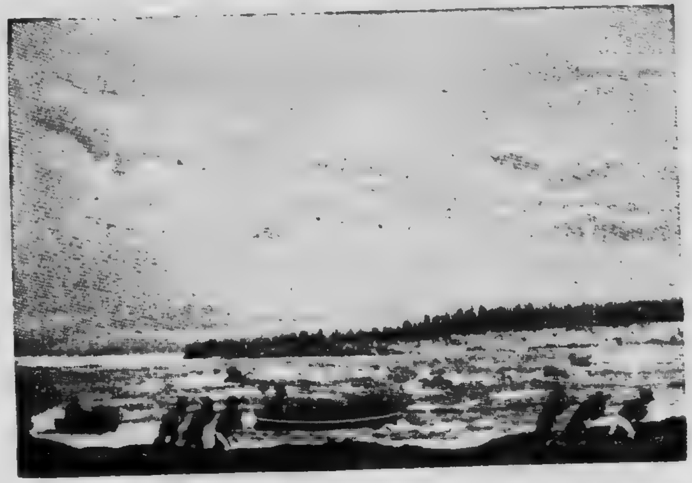

FIG. 101.

Hauling the bateaux laden with supplies up the rapids on the St. Lawrence River.

From "Upper Canada Sketches," by permission of Thomas Conant, Esq.

These trips had to be few, as the roads were rough, muddy, and dangerous, and were more often undertaken in winter, when the snow made the roads passable for sleighing. It might require two weeks to haul a load of grain to town and bring back the things the family wanted. In some parts of the country, where there are few settlers and no railways, people are still living in this manner, and supplies are carried in large boats, or bateaux as they are called, along the rivers and through the lakes which are so numerous all over the country.

But one family did not usually live long alone, for soon others came and settled near them. Perhaps several built their houses near together, forming a little village.

Now that there were more people, the kind of work that each did began to change. Perhaps one of them built a saw-mill (Fig. 102) and sawed lumber for the others when they needed it. Another spent part of his time at carpentry or blacksmith work for his neighbors. A third built a grist-mill and occasionally ground grain into flour. A fourth made shoes or clothes a part of his time, or he doctored the sick, or preached, or taught school.

FIG. 102.

A saw-mill belonging to an early settler near Whitby, Ont., a hundred years ago.

From "Upper Canada Sketches," by permission of Thomas Conant, Esq.

Perhaps the blacksmith spent all his time in his shop, shoeing horses, making ploughs, or other work, and the others worked at their own trades. Then the storekeeper was wanted, who did nothing but buy and sell goods. He went to the city and bought the supplies that he thought his neighbors would need, such as groceries, dry-goods, hardware, boots and shoes, and drugs, and these he kept in his store for sale.

It was not then necessary for the farmer to go to the distant town, because he could usually find what he wanted at the village store. If he raised more potatoes than he needed he could take them to the storekeeper, or country merchant as he is called, and get groceries or other things in exchange. In the early times of the country most of this trading was done by the truck or barter system, as very little money was in circulation. A farmer would sell a load of grain or other produce to the country merchant, and in order to pay the blacksmith who had shod his horses, or his doctor, or the school-teacher, he would give an order on the storekeeper to supply goods for the amount due. Nowadays this is not necessary, as money is more plentiful, and a man can buy and sell where he pleases.

Each year more people took up land, until a great part of the country became carefully cultivated, and towns and cities grew up. Then they began to live in the manner that is now so common. That is, each man now confines himself to one or a very few kinds of work, and depends upon other men for the other things he needs. Those who live in the country are chiefly farmers, and raise the food that we eat. Others are busy at work connected with various natural products of the land and water (p. 79).

Many, instead of cultivating these natural products, are engaged in mills and factories. One saws logs into lumber, or makes doors or such-like articles; another prepares wood pulp for manufacturing paper (Fig. 103); one manufactures cloth; another stoves; another shoes; while some follow the industries of tailoring, tanning hides, printing newspapers, etc.

Fig. 103.

Wood-pulp mill at Sault Ste. Marie, where spruce and other woods are ground into pulp and prepared to be made into paper.

Still others are engaged in a third kind of work. They do nothing but buy and sell articles, and among them are all the merchants that we see in the stores.

Fig. 104.

Harbor of St. John, N.B., from which much lumber is shipped away. Notice the tow-boats ready to tow vessels against the swift currents caused by the tide.

Under these conditions the work that one man does is not only of one kind, but it may be of a very simple kind. For example, a man may do nothing but drive a team, or he may make shingles, or drive nails, or tie up sacks of flour, or put in the heads of barrels. How different this is from the work of the pioneers!

As a rule, each town or city is specially interested in one or a few kinds of industries. For example, a town that is favorably situated at the outlet of a wooded district, will probably have an important lumbering industry. One in the midst of mountains may make mining its especial work, or another, near great wheat fields, may have important flour mills. A town with a harbor on the sea-coast (Fig. 104), or at the head of navigation (Fig. 111) on the rivers or lakes, is interested in shipping. The abundance of cheap water power to drive machinery also attracts many manufactures to its neighborhood (Fig. 105).

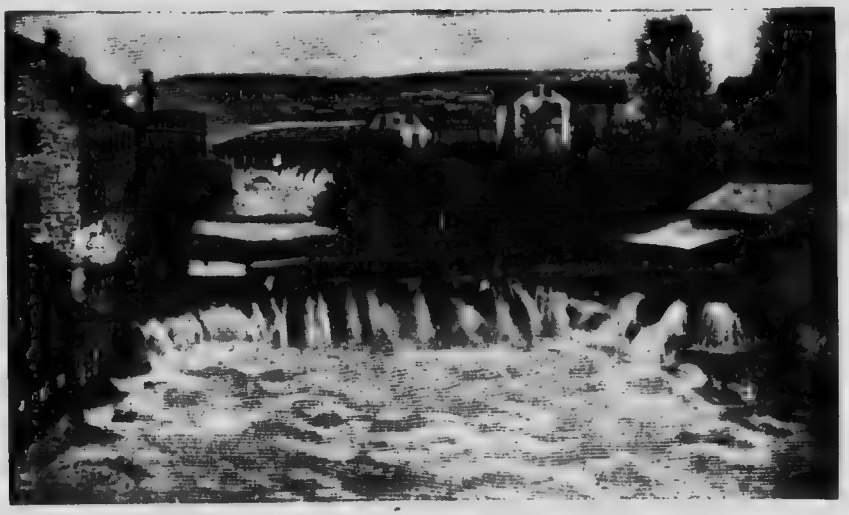

FIG. 105.

View of Sherbrooke, Que., showing the water power on the Magog River.

Thus each town, like each man, is apt to be interested in the production of few things; what they grow or manufacture is sent away in all directions, and the other articles that the people want are brought to them from the many places in which they are produced.

Find out what are the principal industries in your own town, and where their products are sent. Name also some of the substances that are brought to it and where from.

When people are so dependent upon others for most of the materials they use, it is clear that roadways become of great importance. For if wheat for flour be grown in the northwest, and shoes and nails be made in the eastern provinces, and if the thousand other things that we must have are produced in a thousand other places, what good will they do us, if they cannot be brought to us?

FIG. 106.

A winter road to a clearing in the bush.

The pioneers had no roads at first, and one of the hardest pieces of work they had to do was to cut ways through the dense forest. For this reason most of the early settlers chose their lands on the shore of a lake or bay, or on the bank of a river. In summer the water formed a good natural road for their boats, and in winter when frozen over it formed a smooth, level road for their sleighs. The winter snow makes the great highway now for the dog-teams and sledges of the northwest (Fig. 84), as well as for farmers and lumbermen throughout the whole country.

In the lumbering districts the snow-road, even now, is a necessity, as, when the snowfall is light, it is almost impossible to haul the logs to the banks of the streams ready to be floated down with the spring thaw.

In the mountainous districts, where there are no roads, as on the way to the Klondike gold fields, it is necessary to follow a *trail* or narrow path; and, instead of using a waggon, to carry goods strapped on one's back or else upon horses or mules (Fig. 107).

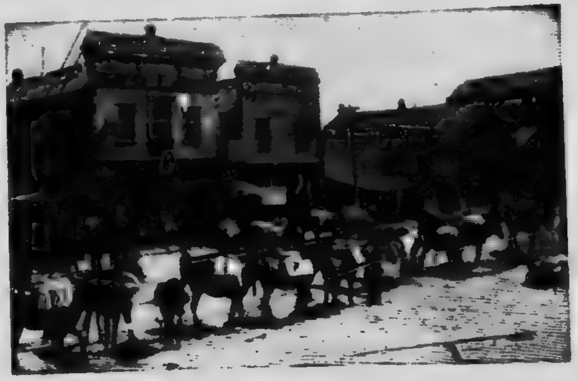

FIG. 107.

A pack train at Dawson, Yukon Territory, which has come over the passes of the Rocky Mountains.

A great deal of labor has to be spent in making good roads. Not only must trees be cut down and stumps and stones be removed, but steep places must often be levelled. Bridges are also necessary, and much work must be done to keep the roads in repair. In the more settled parts of the country great sums are spent in making good roads, as it is found to be better to spend money in this way, than for the wear and tear of conveyances, injury to horses, and the great loss of time so often caused by bad roads. The Government, also, spends large amounts every year in building roads into new districts for the purpose of opening them up to settlers.

In cities, instead of the mud or gravel or plank roads of the country, the streets must be paved because there is so much traffic over them. A bed of broken stone is made and rolled level, or blocks of stone are laid down side by side; and in many cities asphalt pavements are common. What kind of streets have you seen, and how were they made?

We have already considered the importance of rivers and lakes (p. 48) as roadways, both in summer and winter. Not much more than sixty years ago there were no railways in Canada, and people depended upon steamboats or sailing vessels or bateaux for their supplies from the sea-board, and the arrival of the last boat of the season at the close of navigation was a very exciting time.

While navigation was not obstructed on the lakes, except by storms, it was often very difficult on the rivers on account of the rapids and waterfalls. To pass these it was necessary to unload the boats and carry the goods past the rapids, and then haul the boat laboriously up the rapids (Fig. 101) or run it on rollers over the land.

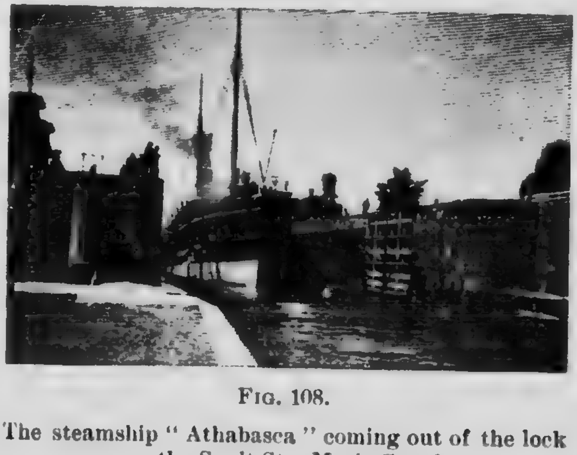

FIG. 108.
The steamship "Athabasca" coming out of the lock on the Sault Ste. Marie Canal.

To overcome these rapids and waterfalls, canals have been built by which great vessels may pass easily round them, being lifted or lowered, in what are called "locks," according as they are bound up or down the river (Fig. 108).

But railways are, in many respects, the best roads. Even with the finest of waggon roads, goods cannot be carried more than twenty to forty miles a day, and it was considered fast travelling when the old stage-coach (Fig. 109) with its four or six horses could make ten miles an hour. Boats are somewhat faster, but railway trains will travel forty miles in an hour, and they take both passengers and freight much more cheaply than they can be carried by waggon or cart.

FIG. 109.

A stage-coach, sixty years ago, before the railways were built.

As we ourselves travel on passenger trains, we are inclined to think that the chief business of railways is to carry people; but this is not generally the case. Their main business is to carry freight, such as grain, cattle, groceries, and machinery; and by doing this they have had a great influence upon the development of the country.

For example, a few years ago it would have done little good to raise cattle and wheat in the far west, because they could not be sent to the great cities to be sold; but,

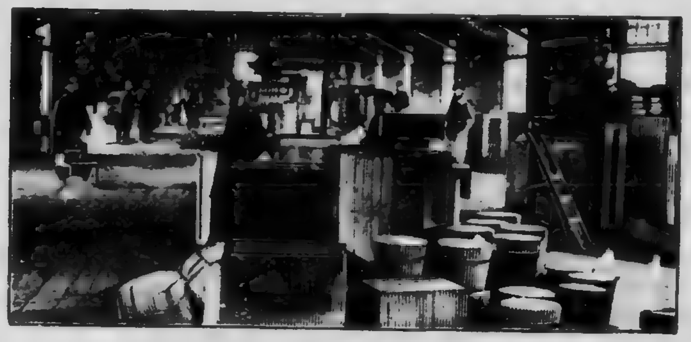

FIG. 110.
A view of the interior of a large freight depot.

as soon as railways were built, these industries and many others became of great importance. There is now, therefore, much more buying, selling, and carrying — that is,

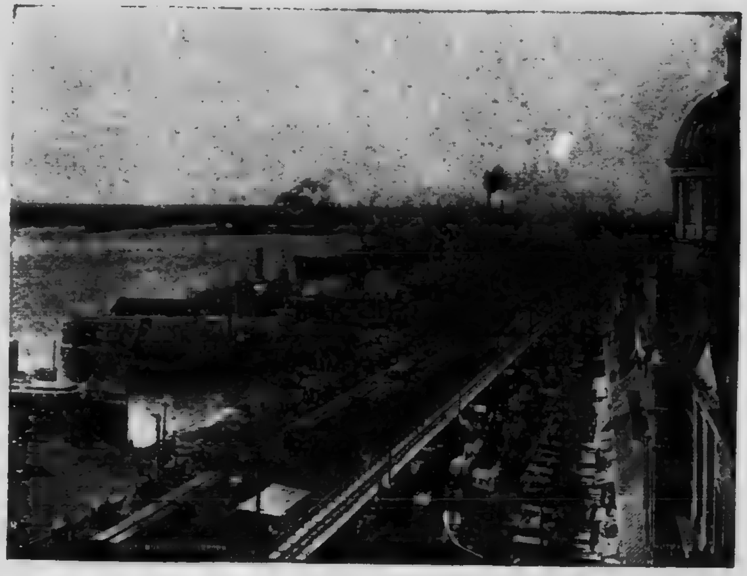

FIG. 111.
A busy day at Montreal. The building on the right is Bonsecours Market. Note the busy street, the railway, the river, and ocean steamships.

much more *Commerce* — than before the railways were built.

Letters, newspapers, and express packages are carried very rapidly on the trains. Formerly they were sent by stage-coaches or on horseback; but now many passenger trains have one or two cars used for mail purposes alone.

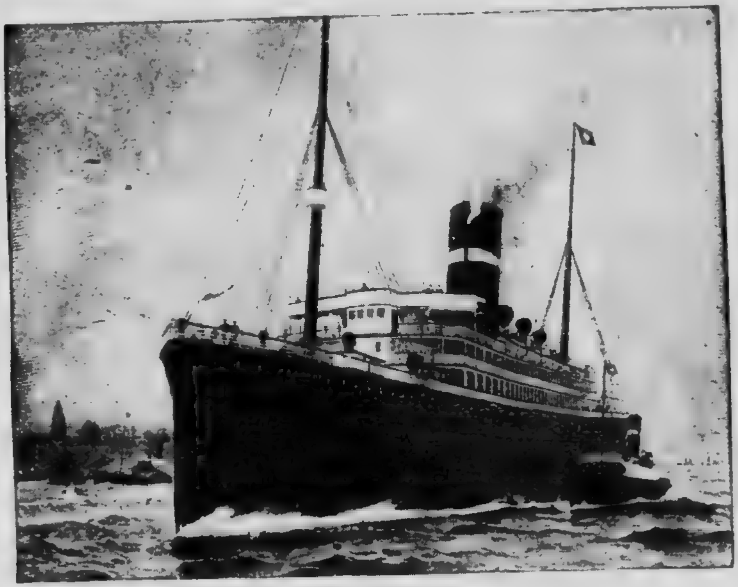

FIG. 112.

A great ocean steamship, loaded with Canadian produce, leaving Quebec to cross the Atlantic Ocean to Great Britain.

It is clear, then, that good roadways, whether made of soil, water, or iron, are a great help to trade. In fact, without them there could be very little commerce. The waggon roads in the country and city are of great value in carrying goods for short distances, as, for instance, to the river, wharf, or railway-station, where boats and trains are used to carry them farther.

Not only is there commerce on the land, but as we have already seen (p. 61), thousands of vessels are engaged in carrying freight on the ocean or on the Great Lakes. They are constantly passing up and down the coast, going from one port to another, carrying loads of lumber, coal, fish, and hundreds of other articles.

Vessels are also coming and going at all times between Canada and other countries (p. 63), bringing materials which we need, and carrying away some of our products (Fig. 112).

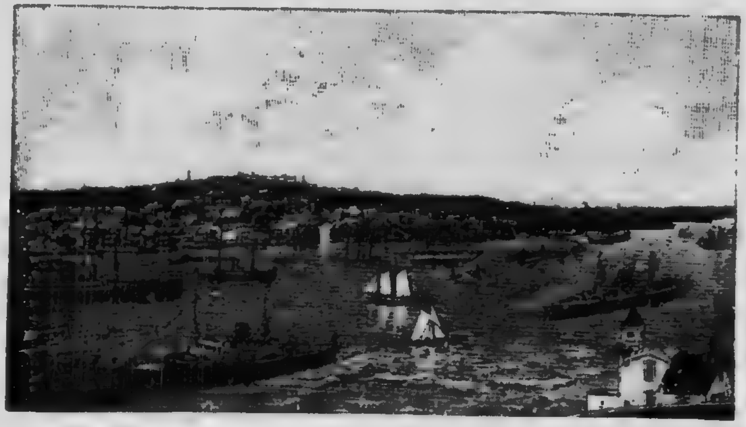

Fig. 113.

View of Halifax, N S.

Note the great battle-ships lying at anchor in the harbor.

In order to protect, if necessary, its great fleet of merchant ships which navigate the ocean highway, Great Britain maintains a vast number of powerful iron-clad battle-ships and swift armored cruisers, which are always in readiness at the various seaport or naval stations of the Empire (Fig. 113), of which Canada is proud to form a part.

XIII. GOVERNMENT

EVERY boy and girl has heard men talk about *voting* and has noticed how interested they often become as election time approaches. But do you know what voting is for? Do you know why the day for voting is called *election day?* Find out what you can about voting and elections.

Laws or *Acts of Parliament* and *Members of Parliament* are frequently mentioned when men are talking about election. So are also *offices* and *officers*, such as *mayor* or *reeve*, *alderman* or *councillor*. Can you name any Laws or Acts; and do you know any officers? You have heard of the mayor or reeve, of the aldermen or councillors, and of the members of Parliament; can you state anything about them? You have certainly seen a policeman; what are his duties?

In our study of commerce we saw that it required a long time to reach our present way of living and carrying on trade. So it is with our government. At present we have many laws, and officers, or persons appointed to carry out the laws, while long ago there were very few of each. Let us see why this is so.

The farmer manages his farm nearly as he pleases. He puts up fences, sells his grain, or feeds it to stock, as seems to him best; and when repairs are needed he looks after them himself. The miller builds a large or small mill, uses old or new machinery, grinds much or little corn, and makes repairs, as he chooses. In each case one man owns and uses the property.

But there are some things that no one man or company owns, and yet all wish to use. These are known as *public* property. This is true, for instance, of roads. All people drive or walk over them, yet they belong to no one person. Who, then, should build roads in the first place, and who should make the necessary repairs on them?

In the early days of the country, this, as well as many other matters of interest to all, was part of the business of the government. But it was found that the better way to do, was for those who used the roads in a small section of the country or *township*, to meet together and choose or appoint certain men who should make it a part of their business to see that the roads were built, and that they were kept in good order. Such men are known as *councillors*.

These *councillors* were naturally those in whom the people had the greatest confidence. They were not only intrusted with the control of the work to be done, but received power to tax or assess all the owners of property to pay for the cost of this work and its management.

Schools also are not owned by one person, and yet many wish to use them. Good buildings, large playgrounds, and good teachers are all desirable, but who should provide for them? This matter was also settled in the same way, by those interested meeting together and electing by vote *trustees* or officers whose duty it was to see that the schools were properly managed.

So it was also with many other important matters, in which all the people were interested. For example, there are usually some persons in every community who are liable to take things that do not belong to them, or who are noisy and quarrelsome. Laws were passed in regard to such offenders, and officers called *magistrates* were appointed to carry out these laws, with other officers, called *constables*, to arrest the offenders when necessary.

Thus far we have been considering only matters which might refer to a small group of people living near together in a small district, township, parish, or municipality, or in a village or small town. But some matters cannot be settled in this manner, because other people, belonging to a neighboring district, are also interested in them. For this purpose *County Councils* were created.[1] The method of electing councillors is different in every province, and is therefore too difficult to explain. The chief officer of the County Council is the *Warden* of the County, and is elected by the Council. In cities the Council is composed of a mayor and aldermen; in towns, of a mayor and councillors; in townships, municipalities, and villages, of a reeve and councillors.

In a similar manner counties unite together to send representatives to discuss matters in which they are all interested, and to make laws to regulate these matters. The union of these counties forms the *Province*, and their representatives the *Provincial Legislature* or *Parliament*.

For example, should it happen that the managers of a railway company charge too much for passengers or freight, laws must be passed, compelling them to charge reasonable rates. But as these railways may be hundreds of miles long, the people of a single town or county could do very little with them. It is therefore necessary for those living perhaps hundreds of miles apart to unite in some way in order to make laws to control the management of these railways; and this is done through *laws* enacted by *Parliament*.

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[1] In Manitoba the work of the County Council is performed by the Municipal Commissioner.

Again, it is important that there should be buildings in which the blind, and the deaf and dumb people may be educated, and insane people taken care of. There must also be strong prisons where criminals may be kept. But there are not many such persons in one town or county, and it would be very expensive to take proper care of only a few. This is another reason why a number of people should unite to make laws on some matters.

FIG. 114.

Institution for educating the deaf and dumb at Belleville, Ont.

We have seen why there must be a government for each small section of the country, and now we see why there must also be a government for each province.

All the men of a province cannot assemble at one point from distances many miles apart in order to attend to such matters. Even if they could make the journey at the time appointed, there would be so many of them that they could not hear one another speak, and little business could be carried on.

For these reasons it is necessary for one man to be elected to *represent* many others. Where there are a great number of people, he may represent many thousands.

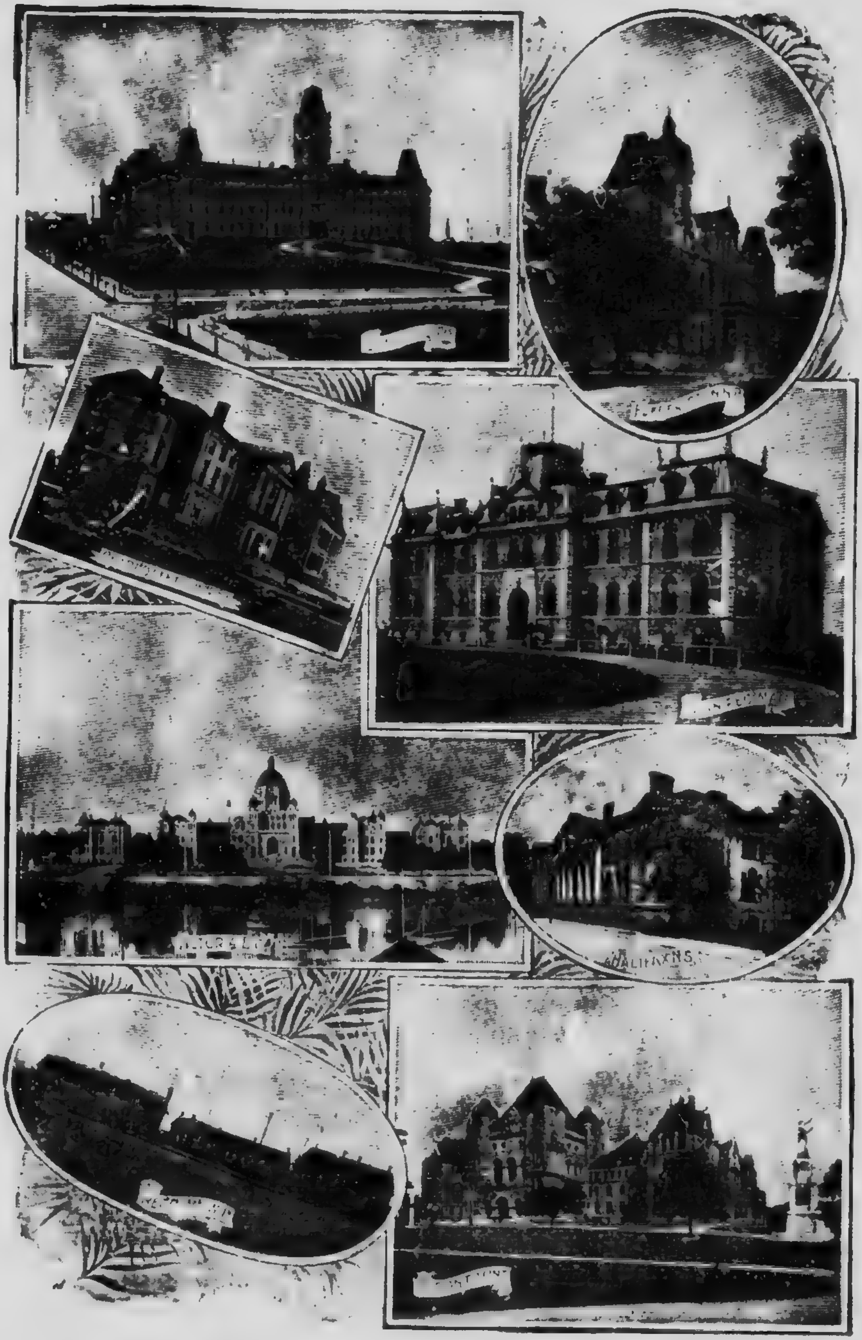
Suppose, for instance, that there are a million people living in a province, and that one man is elected to represent every ten thousand; there will be one hundred such men chosen, and it will be their duty to meet together and make laws for the whole million.

Such men being chosen to represent the others, are often called *representatives;* and because they meet together to discuss the affairs of the province, their united body is called the *Parliament* (or *general council* or *conference*), and they are *Members of Parliament.* As they have the power to make or repeal laws for the province, their united body is also called the *Provincial Legislature*, and they are said to be the members of it.

In order to meet together these men must assemble in a certain place, and that place is called the *Capital* (or head city) of the province. This is a city, where there is a fine building, called the *Parliament House* (Fig. 116), in which the members of parliament hold their meetings, and the government officers of the province have their offices.

We have seen that in the town or county the people not only made laws through their councillors, but also appointed men to see that they were enforced. Such men are necessary for the province also. The leading officer of the parliament of each province is the Lieutenant-Governor, who is intrusted with the carrying out of the laws passed by the parliament. This he does through his officers, or advisers, called the *Ministry*, the chief of whom is called the *Prime Minister* or *Premier*.

FIG. 115.
The Temple Building, in Toronto, Ont.
A lofty city building, containing many people.



Provincial Parliament Buildings.

In large cities, where there are many people, necessitating great buildings (Fig. 115) and many officers of the law, the people there are governed by representatives, just as those of the whole province are governed. These men who make the laws for cities are called *Aldermen*, and their assembly the *City Council*. The highest officer elected to execute the laws in a city is known as the *Mayor*. The building in which the City Council meets, and in which the mayor and his officials have their offices, is called the *City Hall* (Fig. 117). While a city is governed by its own officers in some matters, it also elects members to the Provincial Parliament and is still a part of the Province and under its authority.

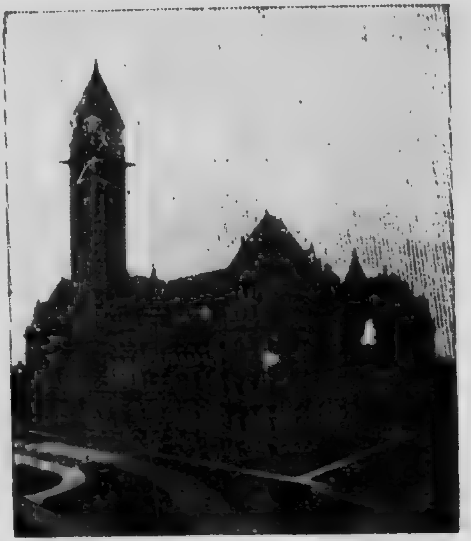


FIG. 117.
The City Hall, Toronto, Ont.

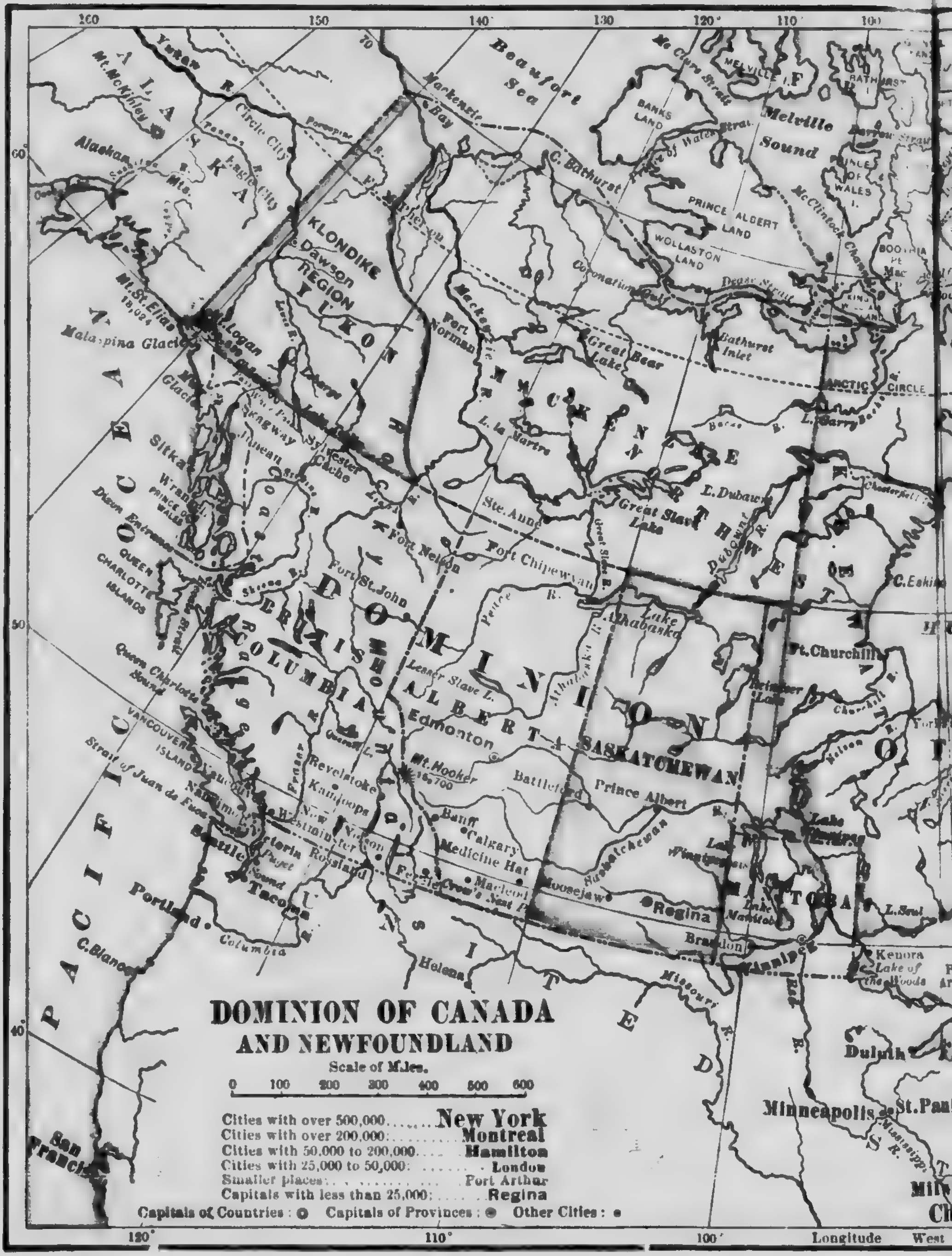
In the Dominion of Canada there are several provinces (Fig. 118), and there are some matters that no province can decide alone, because all the others are equally interested in them. For instance, it would be a great hindrance to trade and travel if each province made its own money; for then each one might have a different kind, with coins of different names and weights. Every time a traveller passed from Nova Scotia to Quebec or Ontario, he might be obliged to take much time and trouble to exchange his money for another kind. So, also, in the case of railways, as we have already seen (p. 121). Mail is another matter that concerns all the provinces, and there are others besides. Can you mention some?

It is evident, therefore, that we need a Dominion Government as well as Provincial, City, Town, County, and Township Governments. The reason for calling it the Dominion Government is, that the different provinces are united to form one British American Dominion, or Dominion of Canada (Fig. 118).

The vast tract of land between the Provinces in the east and British Columbia in the west, extending as far as the Arctic Ocean (Fig. 118), was formerly under the control of the Hudson Bay Company. This powerful and ancient trading company held exclusive trading rights in this region. In order to unite the whole country from the Atlantic to the Pacific Ocean, the Dominion Government purchased these rights. Now the whole of the continent of America north of the United States to the Arctic Ocean, with the exception of one portion called Alaska, is under one authority or *dominion.*

A narrow strip of the eastern coast of Labrador from the Strait of Belle Isle to Hudson Strait is under the authority of Newfoundland. This is only inhabited by a few Indians, and in the summer time by fishermen from that island.

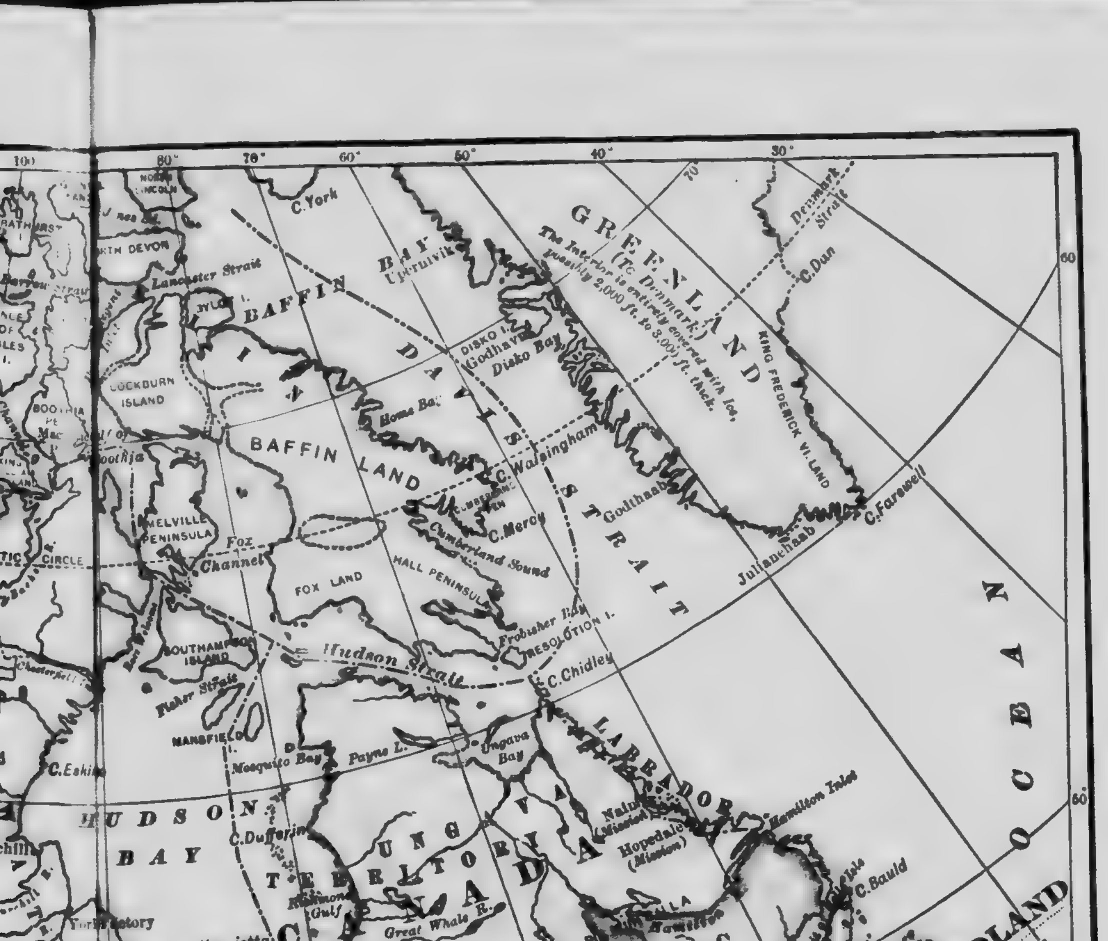
If the people of one province cannot meet in a body to make laws, certainly those of all the provinces cannot do so. Representatives or Members of Parliament are therefore elected and sent from all the provinces to one place, where they consider the affairs of the whole Dominion. The place where they meet is the City of Ottawa, and



DOMINION OF CANADA AND NEWFOUNDLAND

Scale of Miles.
0 100 200 300 400 500 600

Cities with over 500,000 .... **New York**
Cities with over 200,000 .... **Montreal**
Cities with 50,000 to 200,000 .... **Hamilton**
Cities with 25,000 to 50,000 .... **London**
Smaller places .... Port Arthur
Capitals with less than 25,000 .... **Regina**
Capitals of Countries : ⊙ Capitals of Provinces : ● Other Cities : •


100
80°
70°
60°
50°
40°
30°
NORTH LINCOLN
NTH DEVON
Lancaster Strait
Barrow Strait
BYLOT I.
C.York
BAFFIN BAY
Upernivik
GREENLAND
(To Denmark)
The Interior is entirely covered with Ice, possibly 2,000 ft. to 3,000 ft. thick.
Denmark Strait
C.Dan
KING FREDERICK VI. LAND
DISKO I.
Godhavn
Disko Bay
DAVIS STRAIT
COCKBURN ISLAND
BOOTHIA
Home Bay
BAFFIN LAND
C.Walsingham
C.Mercy
Cumberland Sound
Godthaab
Julianehaab
C.Farewell
MELVILLE PENINSULA
Fox Channel
FOX LAND
HALL PENINSULA
ARCTIC CIRCLE
Frobisher Bay
RESOLUTION I.
SOUTHAMPTON ISLAND
Hudson Strait
C.Chidley
Fisher Strait
MANSFIELD
Mosquito Bay
Payne L.
Ungava Bay
LABRADOR
C.Eskimo
HUDSON BAY
C.Dufferin
UNGAVA
TERRITORY
Nain
Hopedale (Mission)
Hamilton Inlet
C.Bauld
Richmond Gulf
Great Whale R.
Hamilton
Strait of Belle Isle
York Factory
C.Henrietta Maria
CANADA
Big R.
LABRADOR
NEWFOUNDLAND
St. Johns
Cape Race
James Bay
East Main R.
Height of Land
QUEBEC
ANTICOSTI
Gulf of St. Lawrence
GRAND MIQUELON (To France)
ST. PIERRE I. (To France)
Banks of Newfoundland
OCEAN
Albany R.
L. Mistassini
PR. EDWARD ISLAND
Charlottetown
CAPE BRETON
Strait of Canso
SABLE I.
L. Seul
L. Nepigon
Saguenay R.
L. St. John
NEW BRUNSWICK
Moncton
NOVA SCOTIA
Halifax
Kenora
Lake of the Woods
Port Arthur
ONTARIO
Ft. William
Lake Superior
Quebec
St. Lawrence R.
Fredericton
St. John
Sherbrooke
Bay of Fundy
Yarmouth
C.Sable
Duluth
Sault Ste. Marie
Montreal
Hull
Ottawa
Peterboro
Kingston
Portland
ATLANTIC
St. Paul
Mississippi R.
Lake Michigan
Lake Huron
Toronto
Guelph
Ontario
Cape Cod
Boston
Hamilton
London
Niagara Falls
Buffalo
Welland Canal
Milwaukee
Chicago
Detroit
Windsor
Lake Erie
UNITED STATES
New York
THE S.-H. CO.
Longitude West 90° from Greenwich
80°
70°
60°

it is on that account called the *Capital of the Dominion.* Here are the Parliament Buildings (Fig. 119) in which the meetings are held; and here also are the offices of the government officers.

Fig. 119.
Dominion House of Parliament, at the capital, Ottawa.

The representatives from all the provinces form the Dominion Parliament. This is just like the Provincial Parliaments; the Dominion members of Parliament making laws for the whole country, while the Provincial members make laws for their own provinces only.

Fig. 120.
QUEEN VICTORIA.
From a photograph taken in 1898.

The Dominion of Canada forms part of the great British Empire, of which King Edward VII. is now the crowned head, and it is in his name that all the laws are made, and by his authority that they are carried into effect, through his ministers. As, however, the King cannot be present at the meeting of the parliaments of the many parts of the British Empire, which are widely separated from each other, he sends some one to represent him in each part. To Canada the Governor-General comes as representative of the King, and he chooses his ministers to carry on the government from among the members of Parliament who come from the different provinces. Before these ministers can make any new law they must have the consent of the majority of the members of Parliament, and nothing can be done contrary to the will of the majority of the people's representatives. Should any minister attempt such a thing, the members of Parliament can demand that the Governor-General dismiss his ministers and supply their places with men in whom Parliament will have confidence.

Fig. 121.
KING EDWARD VII.

Fig. 122.
QUEEN ALEXANDRA.

The Governor-General of Canada is appointed by his Majesty for a term of five years, and has a residence (Fig. 123) called Rideau Hall in Ottawa.

Besides the officials who carry out the details of the government work at Ottawa, there are many men called *officers of the Crown* who work under the control of the

Government in all the different parts of the country, in the post-offices, custom-houses, etc. Do you know any officers of the Dominion Government? Of the Provincial Government? Of the City, Town, or County Government?

Fig. 123.

Rideau Hall, the residence of the Governor-General, at Ottawa.

We have seen how the people in small districts arrange for their home government, and how, uniting with those in other districts, they elect some men to represent them at the Provincial Capital, and others to represent them at the Dominion Capital. These representatives are elected by the votes of the people; whoever receives the largest number of votes in a district being chosen to represent the people of that district.

Canada is a colony of Great Britain, an offshoot from the Mother Country, and the form of government in Canada is similar in form to that of Great Britain, which is called a *Limited Monarchy*. Although the monarch governs the country through ministers or servants of the Crown, yet the Commons or members of parliament, representing the people, have the right to say in what manner they shall be governed; that is, they alone have the right to *make* the laws.

Other countries have different forms of government from ours. Some, like our neighboring country, the United States, have a government, called a *Republic*, where the people not only vote for their representatives but also for their chief ruler, who is called a *President*. The President is elected only for a term of years (in the United States the term is four years).

In some countries, people are by no means so free as we are, and only few of them, comparatively, have the privilege of voting for representatives. Under some governments in Europe, and almost all of those in Asia, the people have very little to say about the laws that shall govern them. Nor do the laws protect all equally for the high officers may say freely what they think, while others may not do this. They must obey their rulers blindly, just as little children are expected to obey their parents.

Such a government cannot be called a *Limited Monarchy* or a *Republic;* it is an *Absolute Monarchy* or *Despotism.* This means that the ruler has complete or absolute power to do what he chooses, without regard to the desires of the people of the country, or to the laws of the land. For instance, he can put men to death without any trial, a thing that the laws of our country do not allow. China and Turkey are examples of this kind of government.

There are other nations in which the people have more freedom than this, but not so much as we have. They are allowed freedom to do some things which they wish, and a certain number of them have the privilege of voting for representatives in their parliaments. In some matters, however, they are compelled to obey, without even asking any questions.. Spain has a government of this kind. Since the people have some rights by which the monarch's power is checked or limited, this government may also be called a *Limited Monarchy.*

When we sum all up, we find that in Canada we have one of the most free and most economical and just forms of government that can be found. We have no Royal Family to maintain at great cost; neither have we constantly recurring presidential elections with their enormous expenses, costing more than any royal family. Almost every man of the age of twenty-one has a right to vote for some one to represent him. Our judges are appointed to their positions for life, are independent of party influence, and are noted for their integrity and ability. Justice is impartially dealt out to rich and poor, and no country is more lightly taxed for the welfare and good government of the people.

XIV. MAPS

We often wish to represent a country so as to tell, at a glance, its shape, and where the mountains, rivers, and cities are located. Such a drawing, called a *map*, may be made of any place, no matter how large or small it is.

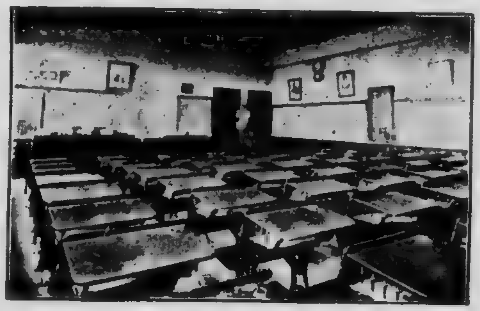


Fig. 124.
Picture of a schoolroom which is 32 feet long and 32 feet wide.

Suppose we desired to draw only a school room (Fig. 124), which is perhaps 32 feet long and 32 feet wide. It would not be easy to find a piece of paper so large as that, and it would not be necessary to do so. A small piece would do, because 1 inch upon it could be understood to represent several feet in the room.

In this case let an inch stand for 16 feet. Since the room is 32 feet on each side, and there are two 16s in 32, the drawing will be just two inches long and two wide. To place the desks and aisles properly, we will need to use a ruler divided into sixteenths, for one foot in the room represents $\frac{1}{16}$ of an inch on the ruler.

The ends and sides are marked (Fig. 125) north, east, south, and west. The teacher's desk is 3½ feet in front of the north wall. There is a row of desks about 4 feet from the west wall. The desks are just 2 feet long, with eight in a row 1¼ feet apart. There are seven rows; and the aisles between them are each 1¼ feet wide. Here is a map of the schoolroom (Fig. 125). Measure each part to see if it has been drawn correctly, using a foot rule that shows the sixteenths of inches. How large is the desk? The piano.

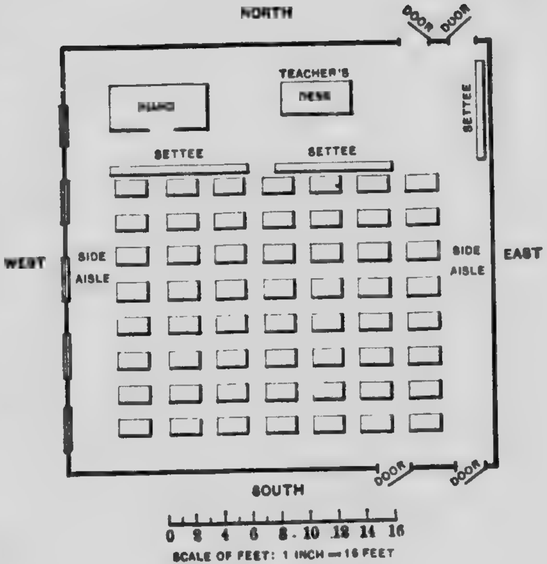


FIG. 125.

A map of the schoolroom shown in Figure 124.

When a person draws in this way, letting a certain distance on the paper represent a much greater one, he is said to use a *scale*, or to make a map *according to a scale*. In the schoolroom just described (Fig. 125), the scale is 1 inch to 16 feet.

In the next drawing, that of the school yard (Fig. 126), the scale must be much smaller, because the yard is so

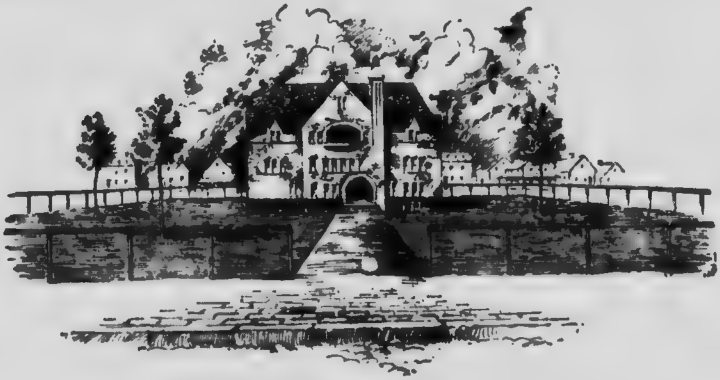
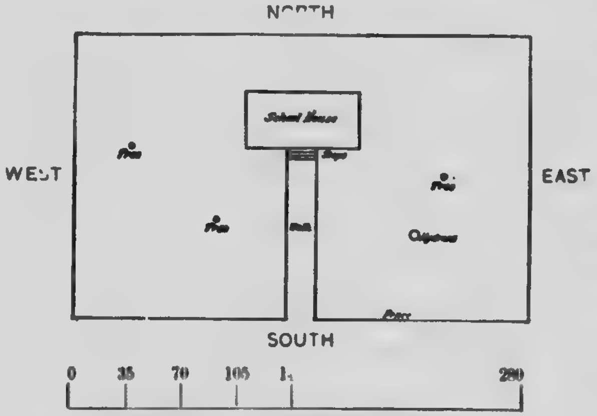


FIG. 126.

Picture of a school yard. Figure 127 shows a map of this much larger than the room, and in the same proportion would occupy too much space. Here one inch represents 140 feet. According to that scale, find out how large the yard and the school building are (Fig. 127). Find how far the trees are from each other, from the nearest fence, and from the building.



Scale in feet: 1 inch equals in 140 feet.

FIG. 127.

A map of the yard shown in the picture, Figure 126.

Can you not make a map of your own schoolroom? What scale will you use? Mark in your own desk, but omit the others, if you wish.

You might also draw a map of your school yard. If you prefer to do so, find its size by stepping or *pacing* it off, making each of your steps about two feet long. Measure the building in the same way. After having finished these two maps, draw a third one, including in it not only the school yard, but also a few of the neighboring streets and houses. The scale for this might perhaps be 1 inch for every 500 steps.

All maps are drawn to a scale in this way, whether they represent a school yard, a province, the Dominion, or even something still larger. Opposite page 137 you will find a map of North America (Fig. 129). On what scale is it drawn? Look at some other maps to find out the scale.

Maps are used a great deal to show the direction of one place from another. But a person must first understand what is meant by north, south, east, and west. Probably you already know that.

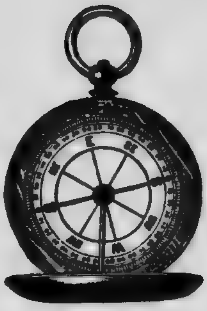


Fig. 128.

A compass. The letter N means north. What do the other letters stand for? Notice that the needle is pointing north and south.

One of the easiest ways to find the direction is by a *compass* (Fig. 128). This is simply a piece of steel, called a needle, that swings about easily and always points to the north. It is magnetized, like the horseshoe magnets that you have seen, and it points northward, because something draws it in that direction; but no one knows certainly what this "something" is.

When the stars are shining, one can tell which direction is north by the help of the Great Dipper. The two stars on the edge of the Dipper point toward the North Star. It is so bright that it can be easily picked out, and it is always to the north of us.

One can also find direction by the help of the sun; for, as you know, it rises in the east and sets in the west. Accordingly, when one faces the rising sun, his right side is to the south and his left to the north. Which direction is on his right and left when he faces the west? The south? The north?

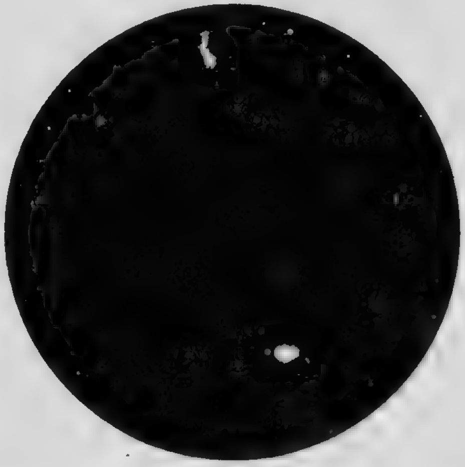


Fig. 129.

Diagram showing the North Star in the centre, the Dipper, and the pointers.

Northeast means halfway between north and east. Southeast means halfway between south and east. What, then, do northwest and southwest mean?

Point north, east, west, south, southwest, northeast, northwest. Walk a few feet in each direction. What direction is your desk from that of your teacher? From the desks of your friends? From the door? What direction is your home from the schoolhouse? From other houses? In what directions do some of the streets extend?

Now let us tell directions on the map. Lay your drawing of the schoolroom upon your desk, so that the line representing the north side of the room is toward the north. Also place yourself so that you are facing directly north as you look at the map. If your desk faces the wrong way for this, turn round, or put your map upon the floor. Now, north on the map is also north in the room, and the other directions on the map correspond with those in the room. In which direction, on the map, is the door from your desk? From the teacher's desk? Place your map of the school yard in the same position and give the directions.

You see that the north side of this map is the side farthest from you; the east side is on your right, the south next to you, and the west is on your left. When a map is lying before us, we usually look at it from this position.

But it is not always convenient to have a map lying down, especially in the schoolroom, where it must be hung up so that the whole class may see it.

Let us hang up one of these maps and take particular pains to put it upon the north wall. Which direction on the map is north now? It is evident that north must be *up*, while east is *on the right*, south is *down*, and west is *on the left*. Certain lines, called lines of longitude, extend due north and south, and others, called lines of latitude, east and west. You should drill yourself to understand directions on maps.

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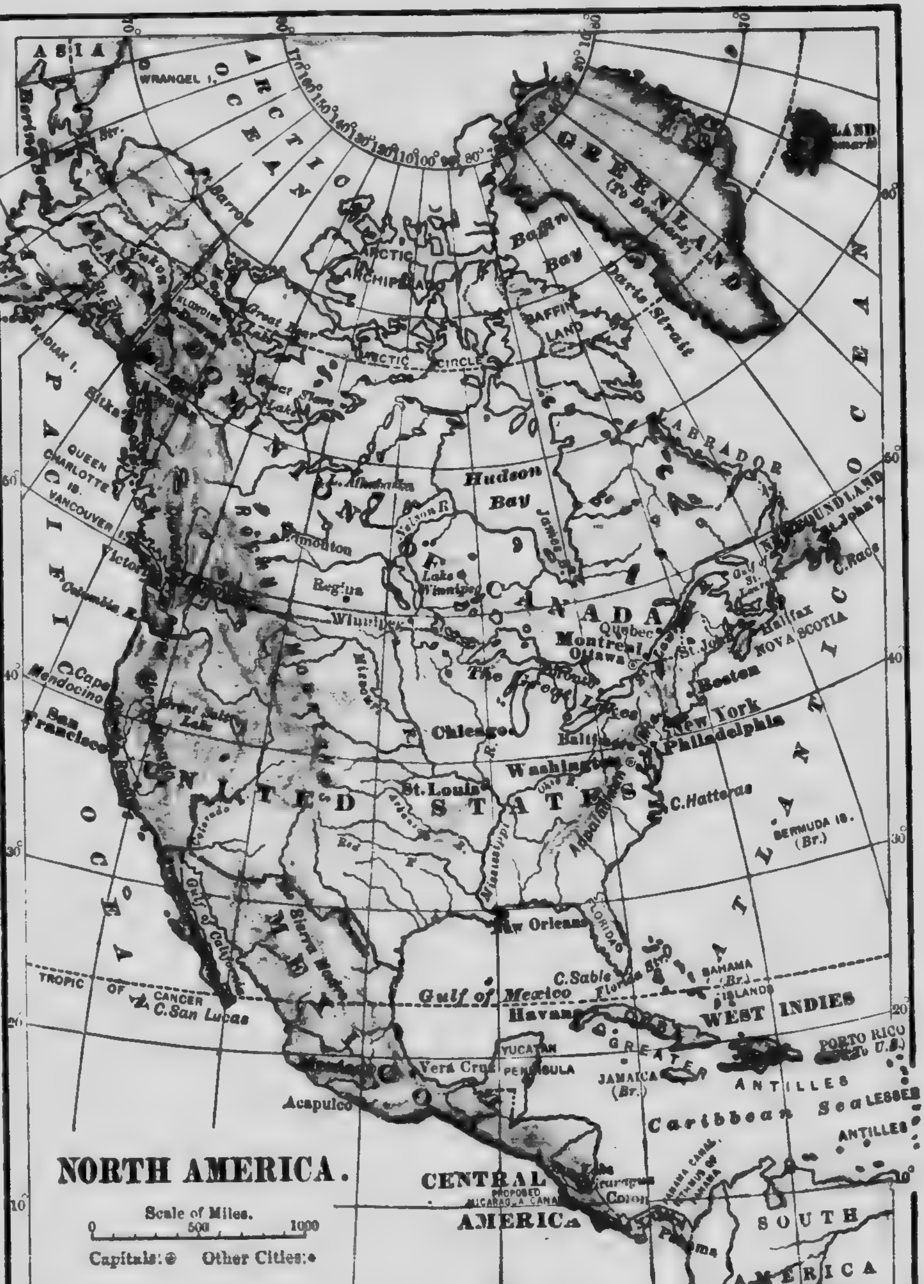
NORTH AMERICA.
Scale of Miles.
0 500 1000
Capitals: ⊕ Other Cities: •
ASIA
WRANGEL I.
ARCTIC OCEAN
GREENLAND (To Denmark)
ICELAND
Baffin Bay
Davis Strait
ARCTIC ARCHIPELAGO
BAFFIN LAND
ARCTIC CIRCLE
Pt. Barrow
ALASKA
Yukon
KLONDIKE
Mt. St. Elias
KADIAK I.
Great Bear Lake
Great Slave Lake
Sitka
QUEEN CHARLOTTE IS.
VANCOUVER I.
Victoria
Edmonton
L. Athabaska
Nelson R.
Hudson Bay
James B.
LABRADOR
NEWFOUNDLAND
St. John's
C. Race
Gulf of St. Lawrence
Regina
Lake Winnipeg
Winnipeg
CANADA
DOMINION OF
Quebec
Montreal
Ottawa
St. John
Halifax
NOVA SCOTIA
Boston
New York
Philadelphia
Baltimore
Washington
The Great Lakes
Toronto
Chicago
St. Louis
Ohio R.
Missouri
Mississippi
Red R.
Colorado
Columbia R.
C. Mendocino
Great Salt Lake
San Francisco
UNITED STATES
Appalachian
C. Hatteras
BERMUDA IS. (Br.)
ATLANTIC OCEAN
PACIFIC OCEAN
Gulf of California
Sierra Madre
MEXICO
New Orleans
FLORIDA
C. Sable
Florida Str.
BAHAMA (Br.) ISLANDS
Gulf of Mexico
TROPIC OF CANCER
C. San Lucas
Havana
WEST INDIES
GREATER ANTILLES
PORTO RICO (To U.S.)
JAMAICA (Br.)
YUCATAN PENINSULA
Vera Cruz
Mexico
Acapulco
Caribbean Sea
LESSER ANTILLES
CENTRAL AMERICA
PROPOSED NICARAGUA CANAL
Colon
Panama
PANAMA CANAL
ISTHMUS OF PANAMA
SOUTH AMERICA
120° 110° 100° Longitude West 90° from Greenwich 80° 70°
60° 50° 40° 30° 20° 10°
THE M-N. CO.

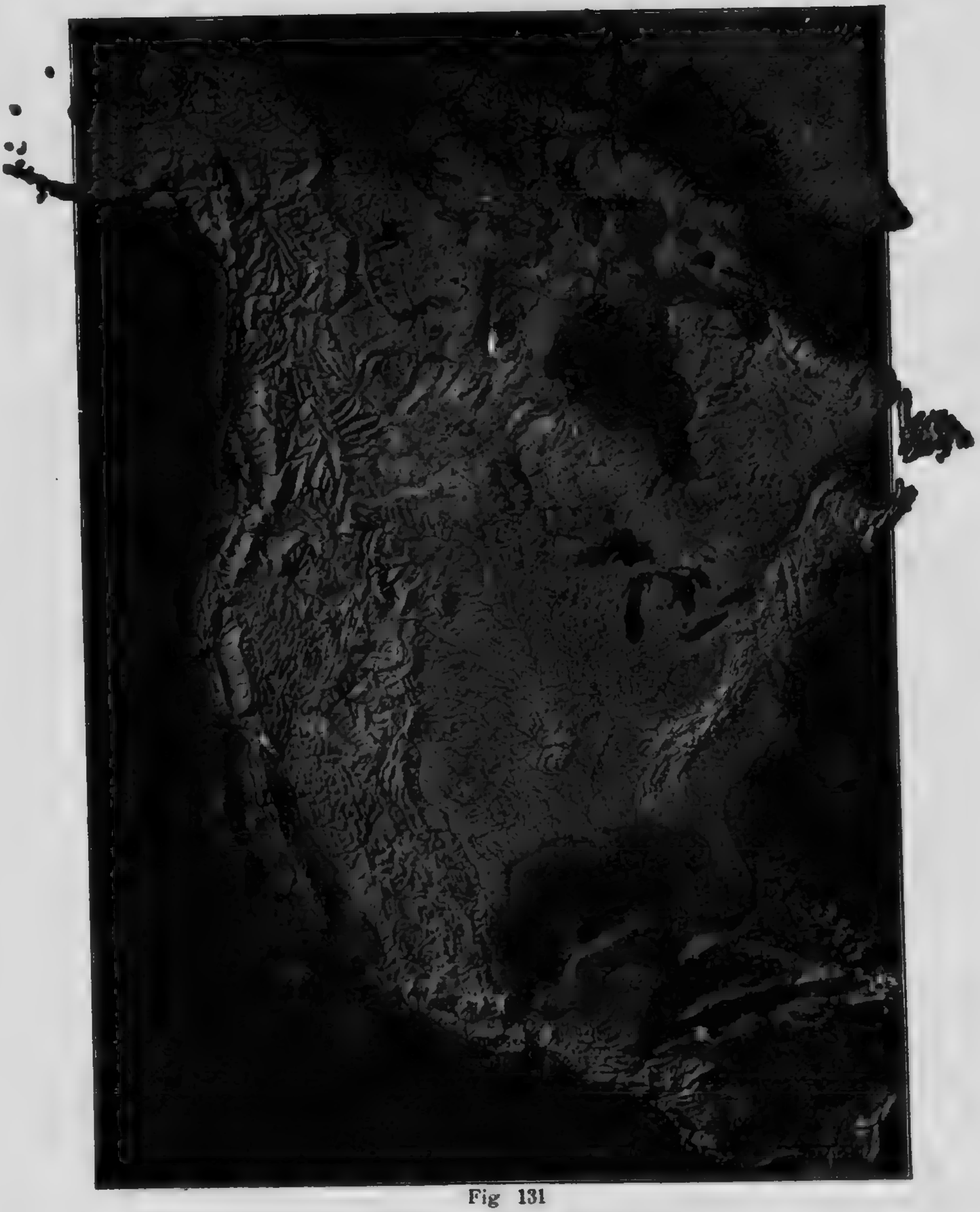

Fig 131

Relief Map of North America.

(Modelled by E. E. Howell).

Give the directions of objects from one another while the map is hanging up. Put up the map of the school yard, and any others that you have, and tell the directions from one place to another.[1]

It is clear now what a map is. It is a drawing telling something about a country, just as a letter may be some writing telling something about a friend. When you read such a letter, you think about your friend, how he looks, what he has been doing, and so on. So when you look at a map, you should think about the country, how it looks, how far apart the places are, and other particulars connected with it.

There is more than one kind of map. Here is a picture of North America (Fig. 131). It shows how this continent might appear if you looked down upon it from some point far above. A picture like this, showing the mountains and valleys, is called a *relief map.* That is, it gives you some idea of the relief or height of the land.[2]

The maps that you have been drawing do not show this. They are flat maps, representing the country as if it were

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[1] After the children are quite at home in using the map when it is hung on the north wall, hang it on other sides of the room and let them give the directions. This is easy work if properly graded; but the fact that many children studying geography are confused in regard to directions on the map suggests that caution be exercised.

It is well to bear in mind that this is simply a rule of position that every map maker has adopted to avoid confusion. A picture of any part of the world would be just as correct, if drawn showing the positions reversed as was formerly often done.

[2] If it seem desirable, the teacher may introduce the study of contour maps at this point. The children might draw a contour map of their own neighborhood, and then possibly make a relief map from it by cutting out pieces of cardboard that correspond to the spaces between the lines. Relief maps may also be constructed by modelling in sand or, better still, in putty, as the latter can afterward be colored, if desired.

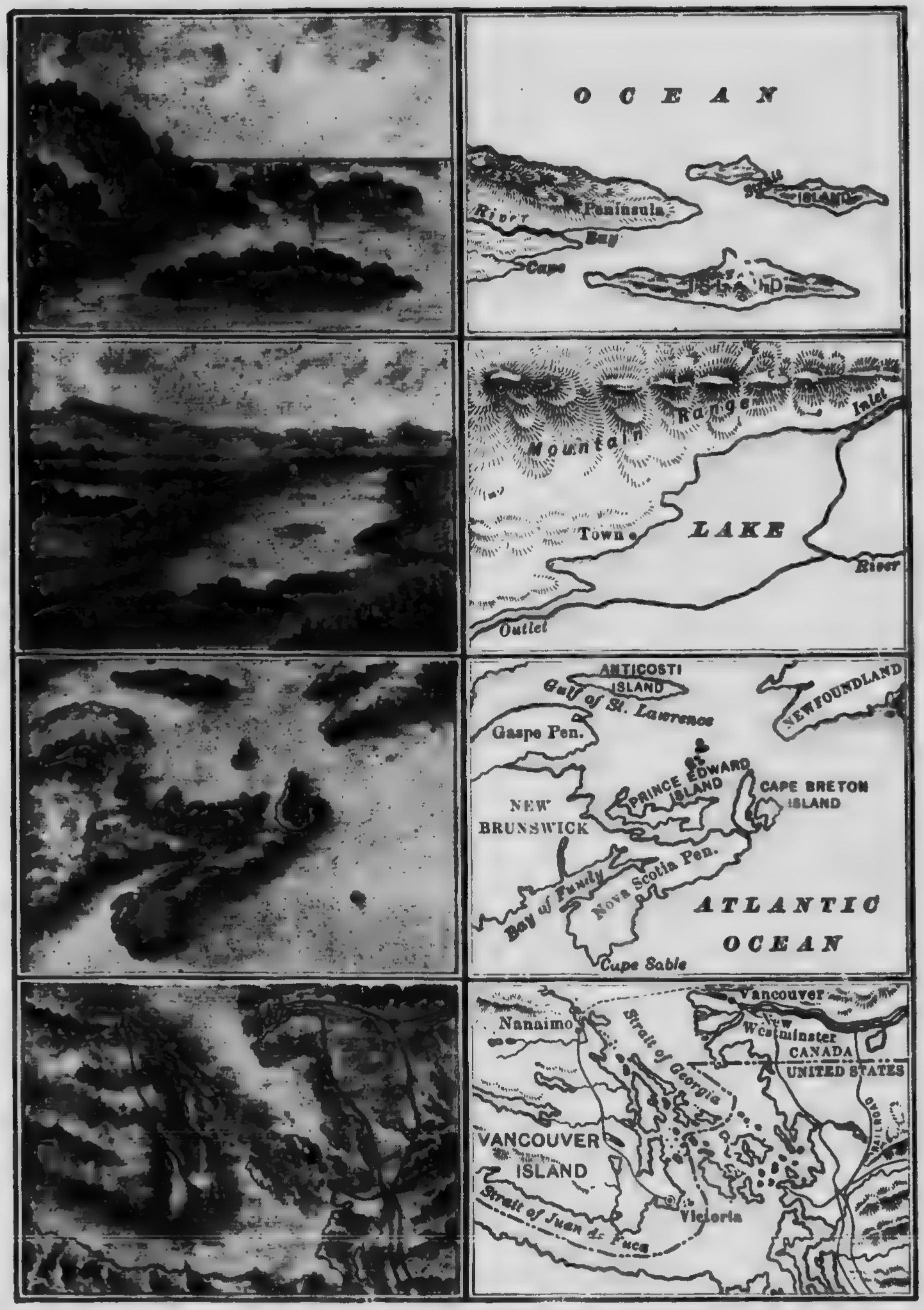
OCEAN
Peninsula
River
Bay
Cape
St.
ISLAND
ISLAND
Mountain
Range
Inlet
Town
LAKE
River
Outlet
ANTICOSTI ISLAND
Gulf of St. Lawrence
NEWFOUNDLAND
Gaspe Pen.
PRINCE EDWARD ISLAND
CAPE BRETON ISLAND
NEW BRUNSWICK
Bay of Fundy
Nova Scotia Pen.
ATLANTIC OCEAN
Cape Sable
Vancouver
Nanaimo
New Westminster
CANADA
UNITED STATES
Strait of Georgia
RAILROAD
VANCOUVER ISLAND
Victoria
Strait of Juan de Fuca

Fig. 131

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a flat surface. Opposite page 137 you will find a flat map of North America. Compare it with the relief map opposite and notice the difference.

In Figure 132 you will see the way in which flat maps are made to represent the land and water. No attempt is made on the flat maps to show just what the country looks like, that is, to represent its relief. They merely represent the position and direction of towns, rivers, lakes, etc. just as if the country were perfectly flat.

REVIEW QUESTIONS

AND

SUGGESTIONS FOR STUDY

AT HOME AND OUT OF DOORS

I. THE SOIL

Review Questions. — (1) Of what is the soil made? (2) How can you show that the little bits in it are hard like stone? (3) What happens when stones are rubbed together? (4) If you have ever seen rocks that were decaying and crumbling, tell about it. (5) How does water enter rocks? (6) What happens when water freezes in the cracks? (7) What else helps to crumble the rocks and soil? (8) What is beneath the soil? (9) Make a drawing, like Figure 4, showing the rock beneath the soil. (10) Tell about the depth of the soil. (11) Why is there no soil in some places?

(12) Why is the soil worth studying? (13) Name two things that plants take from it. (14) Of what advantage is a deep soil? (15) Do all plants want the same kind of food? (16) What causes the different kinds of soil? (17) What has made some soils so black? (18) What is fertile soil? (19) Sterile soil? (20) How are some soils robbed of their plant food? (21) What is used to make them fertile once more? (22) Tell what you see in Figs. 1, 2, 3, 4, 5, and 6.

Suggestions for Study at Home and out of Doors. — **Here are things, some of which, at least, you will be able to see or do for yourselves:** (1) Find a place where men are digging a ditch or cellar, to see how the earth looks below the surface. (2) Find a boulder, cliff, old stone wall, or an old headstone in a graveyard, and see if the stone is crumbling. (3) Break some pebbles open to see whether or not they are decayed on the outside and fresh within. (4) Change a stone to dust. (5) Collect several different kinds of soil. (6) Plant beans in each kind, at the same time, and see in which one they grow best. (7) See what the effect would be if no water were given to some of them. (8) Find out what trees and vegetables grow best near your home. (9) What do the farmers prefer to grow? (10) Go to a hot-house to find out what kind of soil is used there, and what is done to keep it fertile. (11) Visit a gardener or a farmer to find out how he cultivates the soil. (12) How many articles can you name, as crockery, for example, that are made of soil or clay? (13) Write a short story about the soil.

II. HILLS

Review Questions. — (1) Is there much land that is really level? (2) What do you understand by rolling land? (3) Were the hills that you know always there? (4) Have you seen water carrying away soil? If so, tell about it. (5) Explain how hills have been made.

(6) What is the base of a hill? (7) The summit? (8) Tell what you learn from Figure 10. (9) From Figure 11. (10) Make a drawing somewhat like Figure 11. (11) On what part of a hill is it coolest? (12) How could you prove this? (13) Why does it often snow on hills while it rains on lower land near by?

(14) What is a swamp? (15) Why should not houses be built on swampy ground? (16) Why are hills liable to be dry? (17) Why is the lowland in cities usually so dry? (18) Why have castles often been built on hills? (19) Why did the earlier settlers place their churches on hills? (20) What other reasons can people have for wishing to look far out over the country?

Suggestions for Study at Home and out of Doors. — (1) Find some ground about your home that seems nearly level. Is it really level? (2) Where is the longest slope in your neighborhood? The steepest one? (3) Observe the water carrying off soil after a rain. Where does the soil go? (4) Write a story about it. (5) Search for a washout after a heavy rain. (6) Where is your highest hill? (7) In what season of the year is it especially pleasant to live on a hill? Why?

(8) Can you find any houses built on low, wet soil? (9) Are their cellars ever very damp? (10) Ask some doctor why one should not live in such places. (11) Find some pictures of castles, showing their location. (12) Is your schoolhouse upon a hill? (13) Name

any houses in your neighborhood that stand on a hill. (14) Where is your most beautiful view? (15) Do your friends agree with you that it is the most beautiful one?

III. MOUNTAINS

Review Questions. — (1) What can you say about the height of mountains? (2) How have they been made? (3) What is a mountain chain or range? (4) How long might it take to climb a mountain a mile high? (5) Why so long? (6) What can you tell about the cold at the summit? (7) How do the trees change in appearance as one mounts higher and higher?

(8) What would you need for a journey up Mont Blanc? (9) Describe the first part of the journey. (10) What is the timber line? (11) What is the snow line? (12) What are avalanches? (13) Describe the view from the top of the mountain.

(14) Mention some reasons why mountains are favorite summer resorts. (15) What kinds of mines are found in mountains? (16) Why is it so fortunate that trees grow so well on mountain sides? (17) What is done with them? (18) Tell what you can about the streams that flow from mountains.

Suggestions. — (1) Watch for clouds that resemble mountains. Make a drawing of them. (2) Find pictures of mountains; note the timber line, the snow line, and other points of interest. (3) Represent a mountain in sand. Show the tree line; the snow line; steep and gentle slopes. (4) Represent a mountain range in sand. (5) In what direction are the nearest mountains? What are they called? How far away are they? Find out interesting facts about them.

(6) Ask some one who has climbed a mountain to tell you about it. (7) Would you care to climb one yourself? Why? (8) Write a story relating the adventures you would expect to meet with in mountain climbing. Describe some of the views you might expect to find. (9) Why do few people live high up on the mountain sides?

(10) Examine a piece of ore (in some museum) and find out how the metal is taken from the rock. (11) Begin a collection for the school by bringing some ores. (12) Look up pictures of woods on mountain sides. You will find several in this book. (13) Find some

pictures which show gorges cut in the mountains by running water. (14) Find out some facts about glaciers.

IV. VALLEYS

Review Questions. — (1) What makes the little valleys? (2) Tell why they must change from year to year. (3) Describe some of those you have crossed on the railway. (4) How many slopes are necessary to make a valley? (5) What is a divide? (6) Tell how large some of the largest valleys may be. (7) How have these very large valleys been formed? (8) What is a plain?

(9) In what parts of mountains do most people live? Why? (10) What is meant by drainage? (11) How do farmers sometimes provide drainage? (12) What is a swamp? (13) Why do roads and railways among the mountains follow the valleys? (14) What is a mountain pass? (15) Where is the most level land usually found? (16) What fields or grounds near you are beautiful? (17) Are there any walks or drives that you greatly enjoy? (18) How do the views change from time to time?

Suggestions. — (1) Find a tiny valley and watch to see if it is changed in any way by a heavy rain. (2) Find a still larger valley in your neighborhood. (3) Find the divide on each side of it. (4) Show that streets and roads are so made that they have a watershed. (5) Make some valleys in clay or sand and show the divides. (6) Where is the largest valley in your neighborhood? (7) Is your home in one of the very large valleys, or in a small one? (8) Show by a drawing like Figure 30 how the largest valleys have been made. (9) Can you show it in any other way? (10) Why should swamp land that has been drained yield uncommonly good crops? (11) Do you know of any roads or railways that follow valleys and wind about the hills? Tell about them. (12) Find some beautiful views in your neighborhood. (13) Make a collection of pictures of valleys. (14) Write a story telling how valleys have been formed.

V. RIVERS

Review Questions. — (1) Describe any stream you have seen. (2) What are rapids and falls? (3) Describe a small stream in the mountains. (4) What does it do with the rocks in its way?

(5) What are tributaries? (6) Does the current grow more or less swift as one goes farther down stream? (7) How does the country change in appearance? (8) What becomes of the pebbles? Why? (9) What is meant by the source of a river? By its mouth? (10) Where do rivers obtain their water? (11) What is a spring? (12) What effect has a heavy rain upon a stream? (13) Why do not large rivers dry up in summer? (14) Why does not sediment sink where the current is swift? (15) What is a flood-plain? Why is it level? (16) Explain how a delta is made. (17) What is a river basin? (18) A river system? (19) Why do plants grow well on the banks of a river? (20) What is irrigation? (21) How are rivers useful for drainage? (22) What is water-power? (23) In what way is a river a good road? (24) Give some of the reasons why many cities have sprung up near great rivers.

SUGGESTIONS. — (1) After a heavy rain, follow a small stream from its source to its mouth. (2) Throw a chip into the water, and follow it as far as you can. (3) Why are the pebbles in river beds usually so smooth and round? (4) If there is a brook or river near you, examine its banks. Is it a tributary of another stream? (5) How deep and how wide is it? (6) Trace a brook to its source, if possible. Find several tributaries. (7) What large river is nearest your home? What are its largest tributaries? (8) What is meant by "up a river"? By "down a river"? By right bank? By left bank? By river channel? By river bed? (9) Find a spring. Why is its water cool? (10) Observe a well that is being dug, to see if underground water is found. (11) Find a flood-plain along the side of a stream. (12) Find a delta. (13) Do you know of a city that gets its water from a river? (14) Make a small water-wheel and arrange for a stream of water to turn it round. (15) Visit a mill that is run by water-power. (16) Find some poems describing brooks and rivers. (17) Write a story of a journey from the source to the mouth of a river.

VI. PONDS AND LAKES

REVIEW QUESTIONS. — (1) Why are dams built in rivers? (2) Explain how ponds are made. (3) How do lakes differ from ponds? (4) How are lakes made? (5) Tell what you can about beaver dams. (6) In what other ways may lake dams be made? (7) What is the inlet of a lake? The outlet? The head? The foot? (8) How does it happen that some lakes have no outlet? (9) What about the water then? Why?

(10) What is meant by shore? By beach? (11) What do you understand by a *regular* lake shore? (12) Make a drawing of a cape; peninsula; isthmus; island; bay; strait. (13) Tell what each of these is. (14) What is the cause of these irregularities? (15) Mention a few uses of ponds and lakes. (16) What is a harbor? (17) Why should the water be deep? (18) How can a harbor protect ships from storms? (19) What is a wharf? (20) How are harbors often made? (21) What is a breakwater?

SUGGESTIONS. — (1) Build a dam in some small stream and note how rapidly the water collects. (2) Find out more about beavers. (3) Look for a pond or lake and examine the dam that caused it. (4) See if there are both an inlet and an outlet. (5) Walk up the lake; walk down the lake. (6) Examine the shore and notice the different forms of land and water. (7) Find a small harbor. Would every bay make a good harbor? (8) Make a small, irregular hollow in clay and fill it with water to form capes, harbors, and islands. (9) Find some of these in the pictures and maps of this book.

(10) How do men get ice from a lake? (11) In what ways do men catch fish? What kinds of fish have you seen caught? (12) Find pictures of good harbors. Look for the wharves and the breakwater. (13) Build a breakwater to form a little harbor in a small stream or pond. (14) Find out how many feet some of our largest ships sink into the water.

(15) Walk toward the nearest large lake. What are some of its tributaries? Where is the inlet stream? The outlet? What are their names? (16) Name some cities that are on lake harbors. (17) Write a story telling what you would expect to see along a lake shore.

VII. THE OCEAN

REVIEW QUESTIONS. — (1) What place does the water of brooks and rivers finally reach? (2) How much of the earth's surface is water? (3) What other facts show that the ocean is very large?

(4) Tell about ocean navigation. (5) What is the cause for irregular ocean shores? (6) Tell what you can about any harbor. (7) Why are large cities found on the fine ocean harbors? (8) Of what use are lighthouses? (9) Name some foods obtained from the ocean. (10) Why do many people go to the seashore in summer?

(11) Do you know of any park or meadow with a stream or lake in it? If so, describe it. (12) Did you ever enjoy watching the water? Where was it? (13) How does the surface of a lake or ocean change at different times?

Suggestions. — (1) In what direction would you go to reach the ocean? How far is it? (2) Find pictures of large harbors with ships in them. (3) Name several seaport cities. (4) Have some one tell you about a journey across the ocean. (5) Name as many articles as you can that come from over the ocean. (6) How does the captain of a vessel know in what direction he is going, after losing sight of land? (7) How are ships made to move through the water? (8) What use is made of whales? (9) Find out how fish are caught. (10) Ask some one who has visited a summer resort on the seashore to tell you about it. (11) Is there any brook or river that you enjoy visiting? Where is it most beautiful? (12) Tell about some of the storms on the ocean described in Robinson Crusoe. (13) Do you know of any views that are made more beautiful by the presence of water? If so, where are they? Describe them. (14) Collect, from old magazines, pictures of beautiful views with water in them. (15) Write a story, telling what you would expect to see in crossing the ocean. (16) Make a drawing of a ship.

VIII. THE AIR

Review Questions. — (1) Of what use is air? (2) How can you prove that air is something? (3) Describe the experiments with the bottle. (4) What do they prove? (5) What are winds? (6) Prove that there are winds high above the ground. (7) Why does the air rise over a heated lamp? (8) What causes winds? (9) In what ways are winds useful? (10) How can you prove that there is water in the air? (11) Where does most of it come from? (12) What do the winds do with this water? (13) Of what service is the rain? (14) What becomes of water as it boils? (15) What is water vapor? (16) What is evaporation?

(17) What happens to vapor when cooled? (18) Tell some ways in which you may see condensed vapor. (19) In what ways may the vapor in the air be condensed? (20) Why can you "see your breath" on cold mornings? (21) How are clouds formed? (22) How cold must it be to form snow? (23) How is dew caused? Frost? (24) Of what importance are the dust particles in the air? (25) Tell how you would keep a weather record.

Suggestions. — (1) Why are stoves made so as to let in air for the fire? (2) What becomes of the air after it enters? (3) How does air reach the wick of a lamp? (4) Try a common drinking glass, instead of a bottle, to show that air takes up space. (5) Heat some muddy water and watch its movement. (6) Why does smoke go up and not down, the chimney? (7) Show how a hot stove causes a movement, or circulation, of the air in a room. (8) Find out how your schoolhouse is ventilated. (9) How many examples can you give of evaporation of water? (10) Cool a piece of glass or iron and notice the vapor condense upon it, when the air is "muggy" or when steam is passing into the air. (11) Why do clouds frequently surround mountain tops? (12) See how early in the evening the dew begins to collect upon the ground. (13) What causes fogs to disappear? (14) Which winds usually bring rain to you? (15) How far have they probably carried the vapor? How long would it take them to do this, if they travelled at the rate of eight miles per hour? (16) Write a story, giving the history of a raindrop.

IX. NATURAL PRODUCTS OF THE LAND AND WATER

Review Questions. — (1) What do you understand by *natural products?* (2) Name some of them. (3) What are the natural products of your neighborhood? (4) For what are these natural products useful? (5) What becomes of the surplus, when there is more than is wanted at home? (6) Tell something about a farming country and its products. (7) About a fruit-growing district. (8) What do you know about lumbering? (9) About mining. (10) Are there any fisheries in your neighborhood? (11) Name some trades to which lumbering gives employment. (12) Name some of the uses to which iron is put. (13) Name some industries dependent on the products of the farm. (14) On cattle and sheep. (15) On the fisheries. (16) What do we get from mines? (17) From quarries?

SUGGESTIONS. — (1) Visit the nearest market, and see what articles are brought there for sale. (2) Find out if these articles are for home use or to be sent away. (3) Visit a railway station, and see what natural products are loaded on the cars. (4) Where are these going to? (5) What natural products does the grocer sell? (6) In what form are they; in sacks, or barrels, or boxes, or tins? (7) Is there any factory in your neighborhood? Or a mill of any kind? (8) Where do they get their raw (or natural) material from? (9) Where are the canned fruit, fish, or vegetables prepared that the grocer sells? (10) Which are home products, and which come from other countries? (11) What natural products do you use for food? For clothing? (12) Where does the coal or wood you burn come from? (13) What materials have been used in building the house you live in, and where do these come from? (14) Write a story about a tree, from the time it is growing in the forest till it is used as lumber in building.

X. OUR DOMESTIC ANIMALS

REVIEW QUESTIONS. — (1) What animals are called our domestic animals? (2) Do other countries have the same kind of domestic animals? (3) Where are the great cattle ranches to be found? (4) What animals do our farmers chiefly raise? (5) What animals do we use for drawing loads? (6) Name some of the animals used in other countries. (7) Where is the horse most valuable? The mule or ass? The ox? The elephant? The camel? (8) Where is the dog used for hauling loads? Can you tell why? (9) Why is a camel most useful in the desert? (10) Why is a mule or a burro most useful in the mountains? (11) Why is an elephant best fitted to break through the jungle? (12) What wild animals act as scavengers in some old countries? (13) Name some of them and where they are found.

SUGGESTIONS. — (1) Ask some farmer what breed of cows gives the most milk. (2) From which does he get the richest cream, and the best butter? (3) What kind of cattle are the best to fatten for beef? (4) Which breed of sheep give the finest or the longest wool (Fig. 75)? (5) Which make the best mutton? (6) Which breed of hogs is the best to fatten? (7) What does he feed them on? (8) Find out about the different kinds of horses and where they come from; those for carriage use, or for riding; and those for teaming and heavy farm work. (9) Have you a dog? Can he draw you in a sleigh or light waggon? (10) Is he like the dog in Figure 84? (11) Have you ever gone through a creamery? If not, take the first chance you get and see how butter and cheese are made. (12) Do you keep any poultry? (13) Ask some friend to tell you how many eggs are sent away from Canada every year. (14) Name the various kinds of food made from the different parts of a hog.

XI. PEOPLE

Review Questions. — (1) Have you ever seen any people of another color than the white people? (2) Tell where the black people came from, and what sort of a country theirs was. (3) How did they live there, and how is it that there are black people in this country? (4) Can you tell what slaves are, and what is meant by slavery? (5) Are there any slaves in Canada? (6) How did the slaves in the United States become free?

(7) What people are called the yellow race? (8) Describe their dress and appearance. (9) What do we get from their country? (10) Have you ever seen any of this race?

(11) What people are the original inhabitants of our continent? (12) Why are the red men called Indians? (13) Give an account of how the Indians treated the early pioneers. (14) How did the early pioneers of the country travel? (15) How were the Indian people divided? (16) Are there any uncivilized Indians now? (17) What is an "Indian Reservation"? (18) Do any of the Indian children go to school?

(19) How many different white nations are represented in Figure 94? Do any of them speak English? (20) Can people of one country understand those of another? (21) Do all the Indians speak the same language?

Suggestions. — (1) Read the story of "Uncle Tom's Cabin" (you will probably find it in your school library). (2) Why is there no slavery now as there was in the time of the story? (3) Are there any colored boys and girls in your school? (4) You have read "Robinson Crusoe"? What is said about his man "Friday" and slavery? (5) Find out all you can about China (Figs. 88 and 95). Could you pick up rice with two wooden knitting-needles? (6) Have you ever tried to paddle an Indian bark canoe? (7) How is it made? (8) Do you know of any Indian village? (9) Where are there still some wild Indians to be found? (Figs. 89, 90 and 91) (10) Do you know any white people who speak other languages than English? (11) Find out what country they come from. (12) Why can you not understand the Chinamen talking together? (13) Why do the black people not speak their own language as well as English? (14) What other language is spoken largely in Canada besides English?

XII. INDUSTRY AND COMMERCE

Review Questions. — (1) How do men earn a living? (2) What do storekeepers and merchants do? (3) What is commerce? (4) Of what advantage is commerce to a country? (5) Where were the only stores a little more than a hundred years ago? (6) How is one country dependent on another? (7) Who were the first settlers in Canada? (8) What other European nations had settlements on this continent? (9) Why were forts (Fig. 98) and blockhouses (Fig. 96) necessary? (10) When did Canada become British? (11) Who formed a large part of the early British settlers in Canada? (12) Describe the home of a pioneer settler. (13) How did he secure supplies? (14) How was trade carried on in the early days? (15) How did industries spring up among the early settlers? (16) Why does the growth of a city depend upon its situation? (17) Tell something about a backwoods road. (18) What is a pack train? (19) Why must roads be paved in cities? (20) What is the use of canals? (21) Why are railways valuable? (22) How is foreign commerce carried on? (23) How does Great Britain protect the commerce of the British Empire? (24) Describe what you see in Figure 113.

Suggestions. — (1) Make a list of the crops grown in your neighborhood. How is the work of producing them done? (2) Do the same for manufactured articles. (3) Write a story describing an early pioneer's journey to the nearest town. (4) Visit a general store in the country. Describe the visit. (5) Make a list of articles which were probably brought from a distance on the railway or on water. (6) Find out where they come from. (7) Describe some of the roads you have seen.

(8) Visit a factory or a mill. Describe the visit. (9) What goods are manufactured there? Where are they sent to, and by what conveyance? (10) What raw material do they use, and where does it come from? (11) Find out what are the principal articles shipped from Quebec (Fig. 112). From St. John, N. B. (Fig. 104). (12) Visit a freight house or railway station, and see what goods are received and what are sent away. (13) What railways are in your neighborhood? Find out where they run to. (14) Tell about any steamers you have seen; where they go, and what they usually carry. (15) Name as many substances as you can that came across the ocean (Fig. 95). (16) Find out some facts about the different articles named in Fig. 95. (17) Write a story giving the history of the material of your dress or coat.

XIII. GOVERNMENT

Review Questions. — (1) Name a few things that no one person owns and that all wish to use. (2) What system was found best for looking after the roads? (3) Why are magistrates and constables necessary? (4) What are laws? (5) Why should towns, villages, and districts unite to make laws? (6) What is the union of their representatives called? (7) Why should counties unite to make laws? (8) What is their united assembly called? (9) Name some of the objects for which they unite. (10) What is a province? (11) How are laws made in the province? (12) Why are the representatives of the people called members of parliament or of the legislature? (13) Where do the members of parliament meet? In what building? (14) What is the capital of your province? (15) Who is the leading officer of the government? (16) Through whom does he carry out the laws made by parliament? (17) Why must large cities be governed by representatives? (18) What are these representatives called? Where do they meet?

(19) Why should not each province make its own money? (20) Why is our country called the Dominion of Canada? (21) How did the various provinces become united? (22) What part of the continent of America belongs to the Dominion of Canada? (23) Where do the members of the Dominion Parliament meet? (24) Why is Ottawa called the capital of the Dominion? (25) Of what Empire does Canada form a part? (26) What is the form of government in Canada? (27) What is meant by a "Limited Monarchy"? (28) Name our late Queen, and the present King and Queen. (29) Who represents the King in Canada? (30) Where does he reside? (31) What is the meaning of "being elected"? (32) What is a republic? A despotism?

SUGGESTIONS. — (1) Who attends to repairing the roads and streets where you live? (2) What officers look after the schools? (3) What are taxes? (4) Are there any public buildings like a Deaf and Dumb Asylum in your neighborhood? (5) In what province do you live? (6) What is the Capital of your Province? (7) How far is it from your house, and in what direction? (8) Who is the Lieutenant-Governor of your Province? (9) If you live in a city, who is your Mayor? If in the country, who is your Reeve? (10) Where is the City Hall? (11) Ask some friend who has travelled abroad if he had much trouble with foreign money. (12) In what direction is Ottawa from where you are, and how far away is it? (13) Who is living at Rideau Hall now? (14) Ask some one to show you a ballot-paper and how to vote. (15) What are the great advantages in being a Canadian?

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